

ENT

Handwritten Note

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Name:

Subject:

ENT

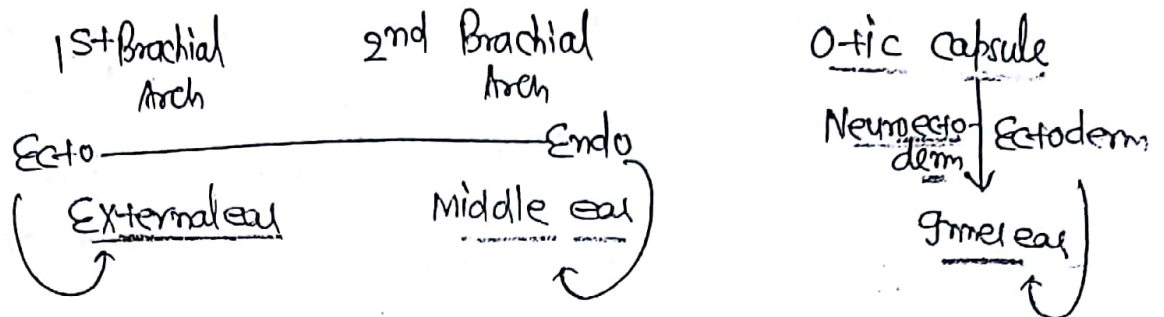


27/3/18

ENT

(1)

EAR ⇒ Middle ear is sandwich b/w the ectoderm.



* Otic capsule gives Rise to ectoderm which gives Rise to inner ear

→ Middle ear cavity - Six sided box of Middle ear cavity

Ant. TEA (Tensor tympani; Eustachian tube; Carotid wall)

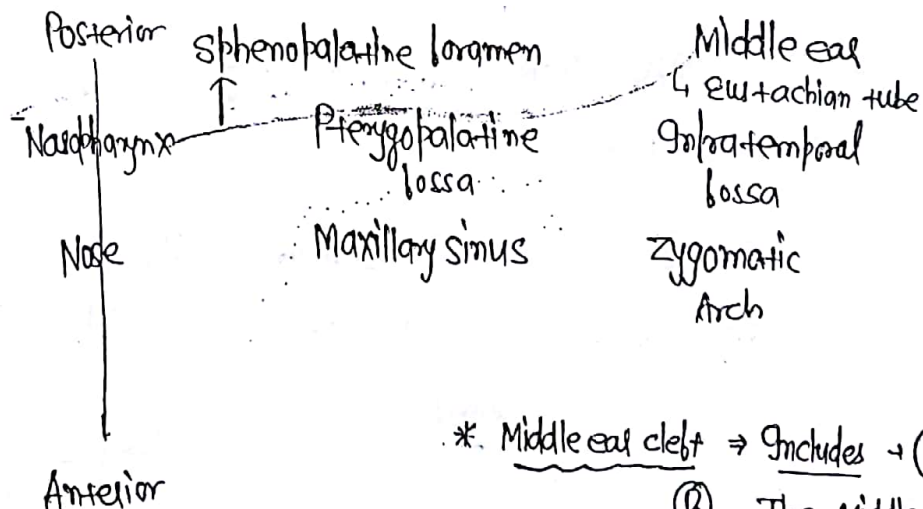
Past. → Mastoid

Medial. → Ptomontary → Inner ear

Lateral → Tympanic Membrane → External ear

Roof → Tegmen tympani → Middle cranial Fossa

Floor → Jugular bulb



(M)

(L)

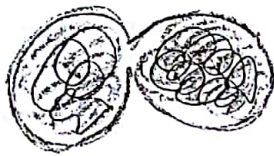
* Middle ear cleft ⇒ Includes → (A) Eustachian tube;

(B) The Middle ear;

(C) Aditus; which leads posteriorly to the Mastoid Antrum & Air cells.

- Eustachian ^{1st} Toynbee test \Rightarrow Eustachian tube patency ***
tube - Starts from Anterior wall of Middle ear;
Going to Lateral wall of Nasopharynx (1.25 cm behind Inferior Meatus),
Length = 36 mm (Reached by the age of 7 years)

- Sphenopalatine Foramen \Rightarrow Angiolibroma (Juvenile Nasopharyngeal Angiolibroma)
(14-15 yr) old boy.
 \downarrow
Biopsy is C/I; b/c it is tumor of blood vessels
 \rightarrow tumor is Removed in total; debulking
Sx is C/I
- Muc benign Neoplasm of Nasopharynx.



- \Rightarrow Dumbbell-shaped tumor
b/c one portion of tumor billing the Nasopharynx & the other portion extending to the Pterygo-palatine fossa.
"Holtzman Miller sign" \Rightarrow Hallmark sign of Angiolibroma
OR \hookrightarrow compress the posterior wall of Maxillary Sinus
"ANTRAL sign"
 \hookrightarrow Result in bending down.

- Maxillary Artery Ligation in Pterygopalatine fossa is done in epistaxis.

- Vidian Nerve cut in Pterygopalatine fossa is done in Vasomotor Rhinitis.

- * Small Angiolibroma \Rightarrow Transpalatine approach.
- * Large Angiolibroma \Rightarrow Transpalatine + Sublabial approach.

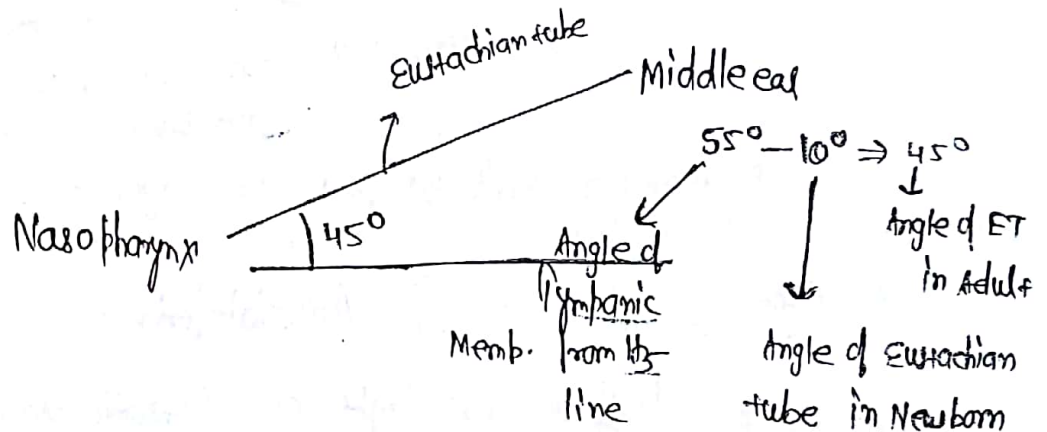
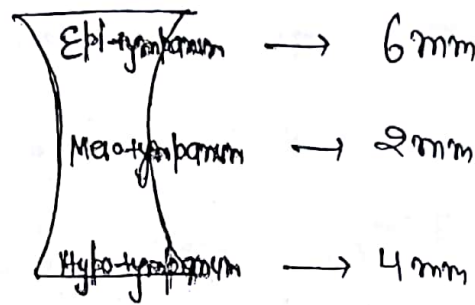
- * Fisch Staging of Juvenile Angiolibroma \Rightarrow

Stage I \rightarrow Tumor is Limited to Nasopharynx / sphenopalatine;
Stage II \rightarrow Tumor is Limited to pteropalatine fossa / mastoid;
Stage III \rightarrow Tumor is Limited to Intratemporal fossa
Stage IV \rightarrow Tumor is Limited to Intracranial fossa

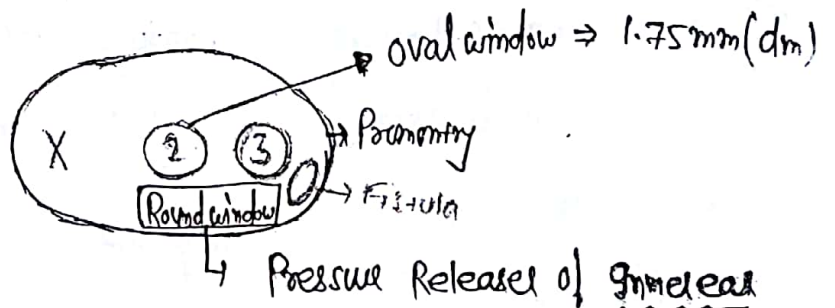
* When we take section of Middle ear; It is "Biconcave" in shape

* Middle ear

- Epi-tympanum \Rightarrow widest (6mm)
- Meso-tympanum \Rightarrow narrowest (2mm)
- Hypo-tympanum



* Pro-tympanum \Rightarrow Part of Middle ear surrounding the Eustachian tube



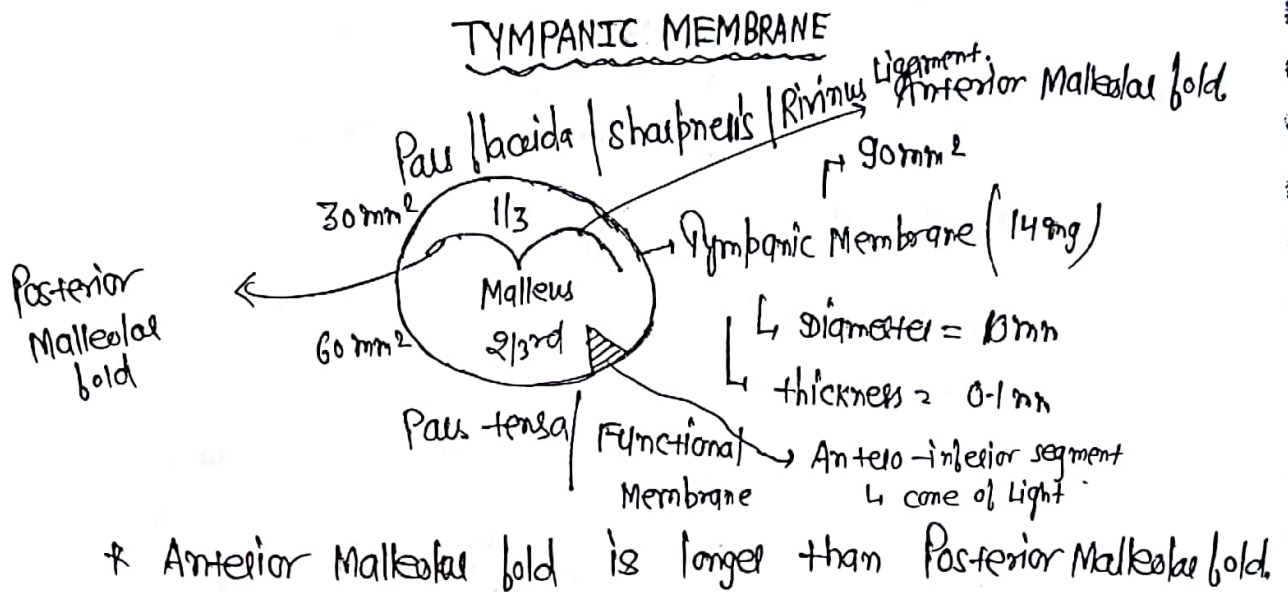
* Eustachian tube is pressure Release of Middle ear

→ Lateral 1/3rd bony

→ Medial 2/3rd cartilaginous

Order of Infection \Rightarrow Mucus \rightarrow Pus \rightarrow Osteomyelitis
 \downarrow
 Fistula

3rd window effect \Rightarrow Loss of sound energy from a Artificial fistula
 \hookrightarrow b/c of damage (opening) in Semi circular canal.



* Cone of Light \Rightarrow @ Antero-inferior

\hookrightarrow if we put light on Tympanic Membrane, cone of light seen,
 \hookrightarrow if we Remove Mucus in glue ear than do Myringotomy.
 \hookrightarrow Grommet Insertion (to prevent accumulation of fluid in the Middle ear).
 \hookrightarrow Small plastic tubes

* Tympanic Membrane contains all the three germ layers; but
 (E) Pars flaccida; Healed TM contains 2 layers (Mesoderm absent)

* Pearly Grey > Pearly white - Colour of Tympanic Membrane

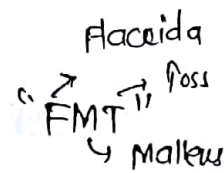
* Curved Membrane effect \Rightarrow Tympanic Membrane is More mobile @ Periphery than at the centre

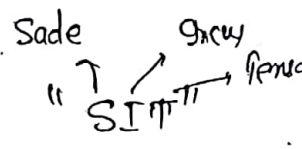
* Most Concave part of Tympanic Membrane \Rightarrow Umbo. (3)

• Order of Reliable Marker of Middle ear \Rightarrow
Umbo > Handle of Malleus > Cone of Light,

* { Only Malleus seen on Tympanic Membrane = Normal
Nothing seen on Tympanic Membrane = Bulging
More than Malleus on TM = Retraction }

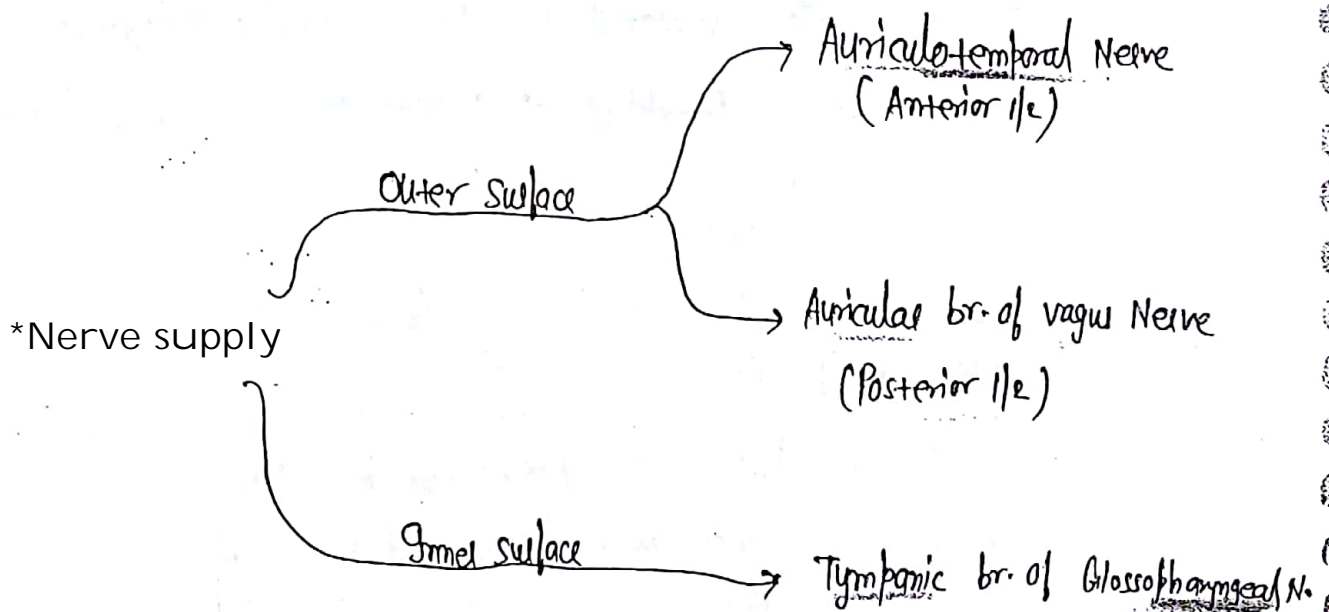
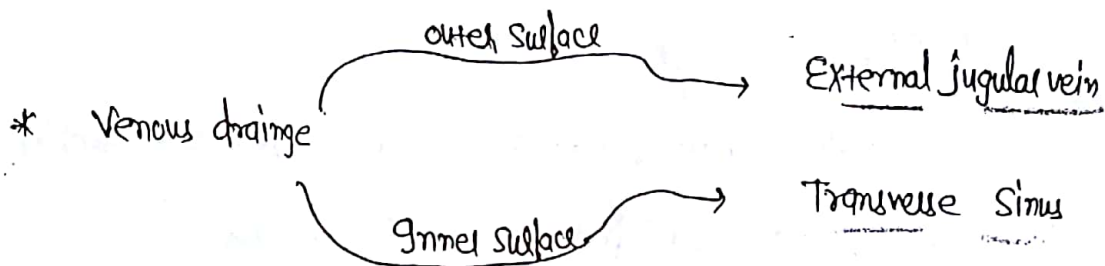
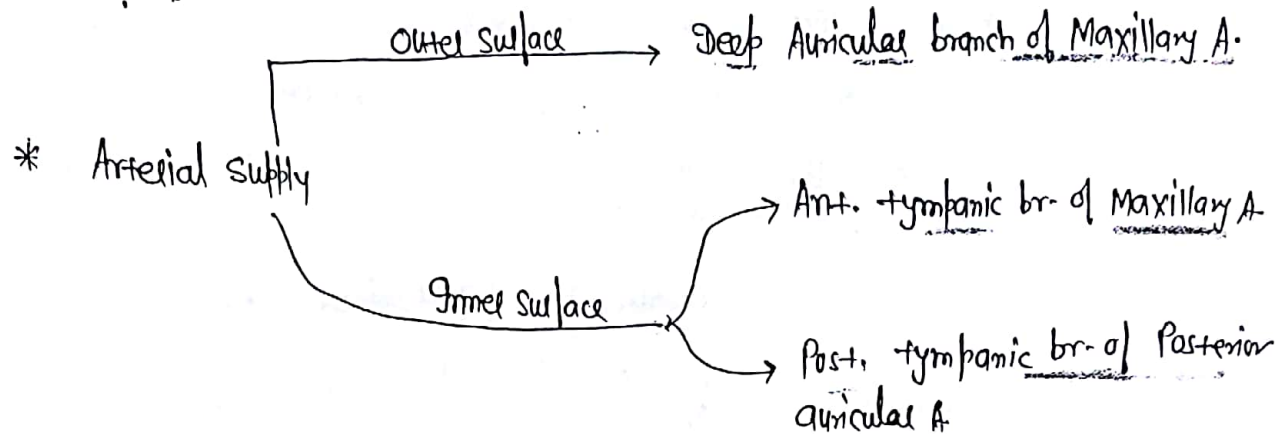
M/c cause / earliest cause = Eustachian tube dysfunction /
Retracted Pouch formation

* Toss Classification \rightarrow 
Grade I \Rightarrow Pals Flaccida Retracted but Not touching Malleus
Grade II \Rightarrow Pals Flaccida touching Malleus
Grade III \Rightarrow Grade II + Mild touching Epitympanum / Scutum
Grade IV \Rightarrow Grade III + Severe damage to Attic / Scutum of Attic

* SADE Classification \rightarrow 
Grade I \rightarrow Pals tensa Retracted but Not touch incus
Grade II \rightarrow Pals tensa Retracted but touching incus.
Grade III \rightarrow Pals tensa touching promontory but mobile
Grade IV \rightarrow Pals tensa touching Promontory and adherent (Adherent) (atalectasis of ear)

- * Multiple Reflection point \Rightarrow Intact Tympanic Membrane
 \hookrightarrow Light Rays are Reflected from Tympanic Membrane

- * Nerve supply; Venous supply; Arterial supply of Tympanic Membrane



Injection of CNS ~~from~~ to Middle ear \Rightarrow via Fissure of Harte (4)

Middle Ear \rightarrow Cavity of Middle ear \Rightarrow Tympanic cavity

- Sensory Supply \Rightarrow 9th & 10th Nerve

Tympanic plexus \Rightarrow Int on Promontory

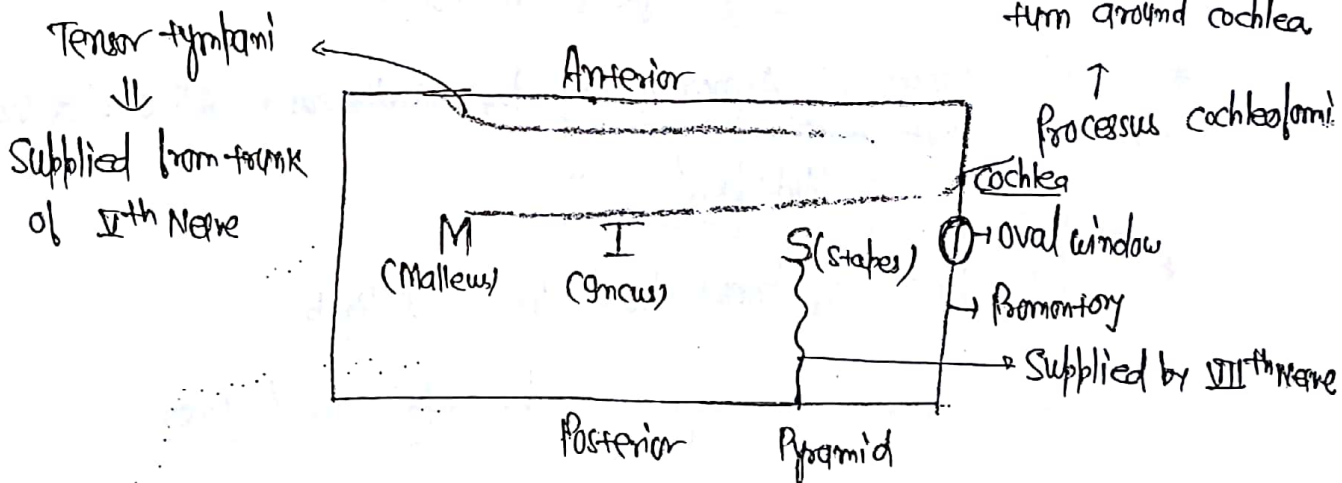
Fibres of 9th Nerve \Rightarrow Jacobson fibre

Fibres of 10th Nerve \Rightarrow Arnold fibre

\hookrightarrow Parasympathetic; but Arnold fibers are sympathetic so Mixed Nerve

* Arnold fibres coming from Carotid plexus at Anterior wall.

- Motor Supply \Rightarrow 5th & 7th Nerve

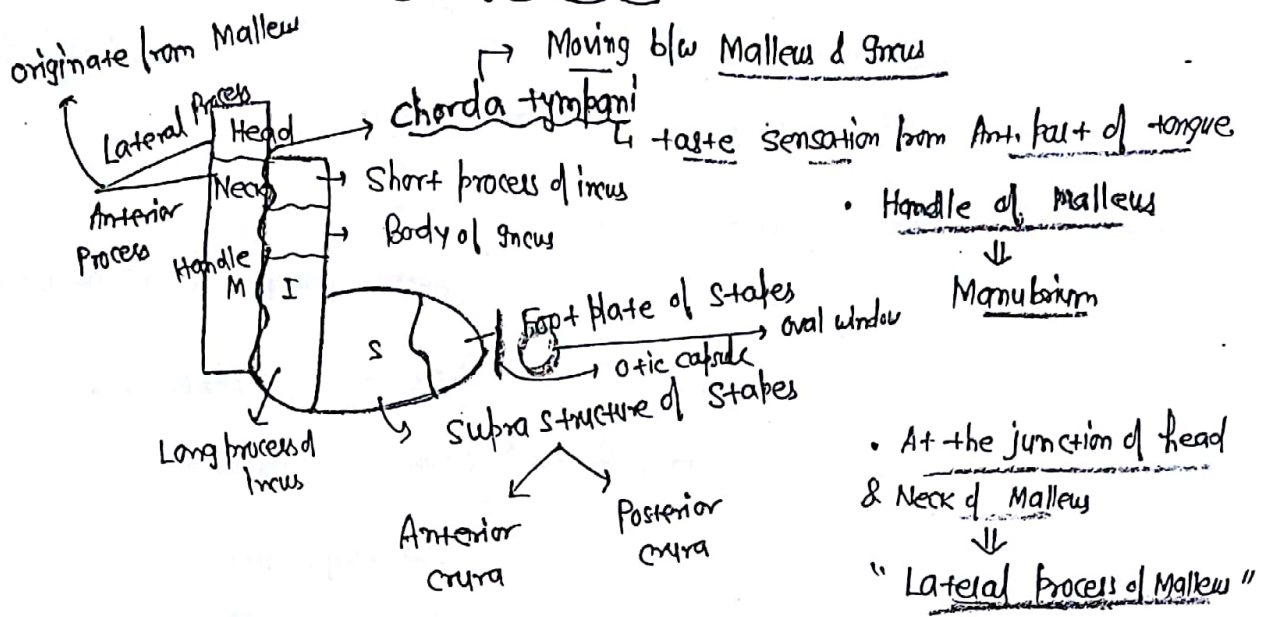


Processus cochleariformis \Rightarrow Hook-like projection Located Anterior to oval window for tendon of tensor tympani.

\hookrightarrow It Marks the Level of the Geny of the Facial Nerve

\downarrow
Important Landmark for surgery of Facial Nerve

Auditory ossicles



Malleus ; Incus \Rightarrow 1st branchial arch
 Stapes \Rightarrow 2nd II

- * Gnathomalleus joint \Rightarrow Saddle type of synovial joint.
- * Gnathostapedial joint \Rightarrow Synovial joint
- \hookrightarrow @ High Risk; b/c Less surface area
- \hookrightarrow Ball & Socket type of synovial joint.

* M/C Congenital Abnormality In middle ear \Rightarrow All ossicles subluxation
 \hookrightarrow Multifocal

* Long process of Incus have lenticular limb
 \hookrightarrow M/C site of Nerve's

\hookrightarrow due to for-fowly Artery

* Vestibular surface = Medial surface of Foot plate
 \hookrightarrow Otic capsule

* M/C site of otosclerosis \Rightarrow Foot plate.

KKK

Tomy = Puncture
ECTOMY = Removal
PLASTY = Repair

]

(5)

Q. In Stapedectomy all of the following Remove except \Rightarrow

- ① Ant. crura of stapes
- ② Post. crura of stapes
- ~~③ Lenticular Process~~
- ④ Foot plate

* Length of Stapedial process Mapped from = Oval window to Lenticular process

* Cholesteatoma

↳ No tumor
No cholesterol.

Mucous \rightarrow Pus \rightarrow Osteomyelitis \rightarrow Fistula
 \downarrow
 Erode columnal epithelium of Middle ear
 & Make it squamous epithelium (via metaplasia)

* Complicated Pus \rightarrow Squamous debris In the Middle ear.

* Pediatric Population comes \Rightarrow Congenital Cholesteatoma
 No H/o ear symptom \Rightarrow 1^o cholesteatoma
 H/o ear symptom \Rightarrow 2^o cholesteatoma
 H/o Trauma \Rightarrow 3^o cholesteatoma

Primary Acquired

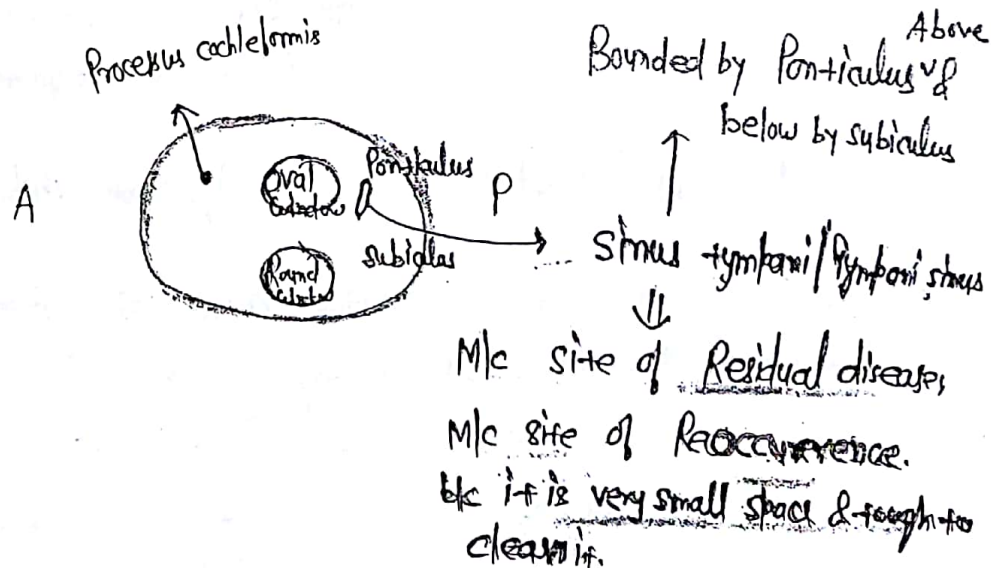
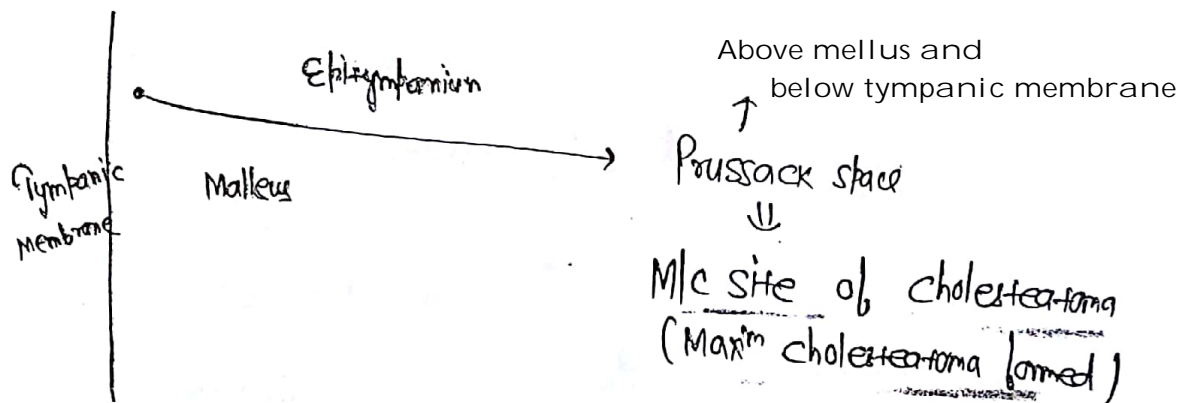
1. Retraction pocket (Wittmaack)
2. Basal cell hyperplasia (Ruedi)
3. Squamous Metaplasia (Sade)

Secondary Acquired

1. Squamous Metaplasia
2. Epithelial Migration (HaberMann)

Tertiary acquired

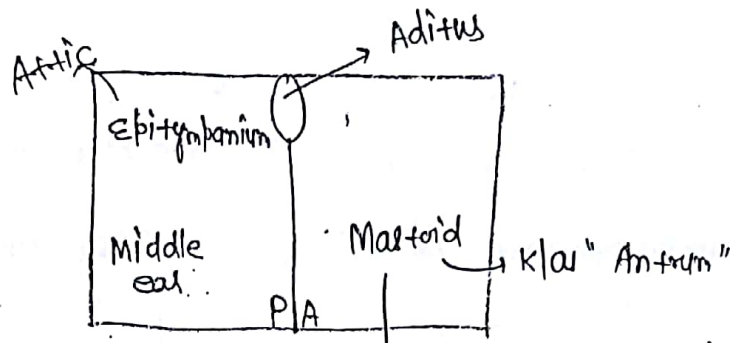
1. Post-traumatic
2. Post-tympanoplasty.



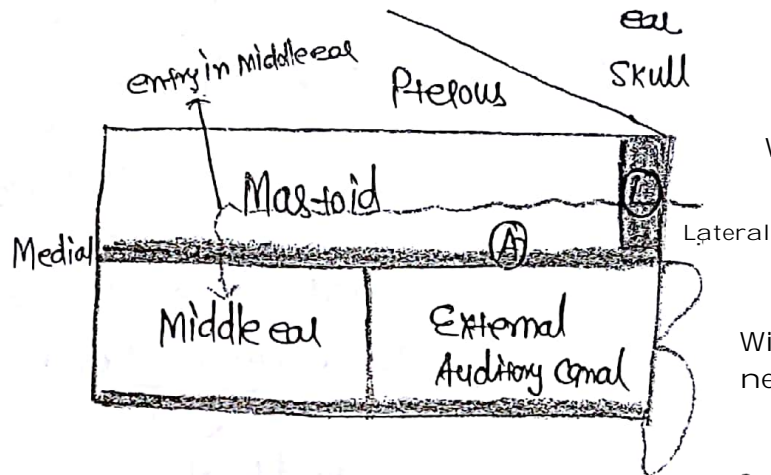
*

Posterior (Mastoid) wall

6



Big hole; which is posterior to Middle ear & also behind the external ear



Width of lateral wall
↓
15 cm

Width of lateral wall in new born -> 1-2mm

* Rate of growth of Lateral wall = 1mm/year

* @ which year Adult size = Newborn size = 15 year

* Approaches to the Middle ear ⇒

Annulus ⇒ Bony canal; on which tympanic Membrane lies;

Via Tympanic Membrane

Trans-tympanic approach
(Rosen
Endomeatal incision)

via Mastoid

Post-auricular approach
(Wilde's incision)
↳ Behind pinna

- When we give 5mm incision then we
have "KORNER SEPTUM"

↳ Pterosquamous suture

- Lower edge of the Mastoid (tip of Mastoid)
is absent in New born.

↓

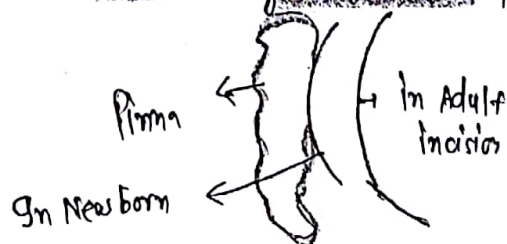
develop of the age of 2 years

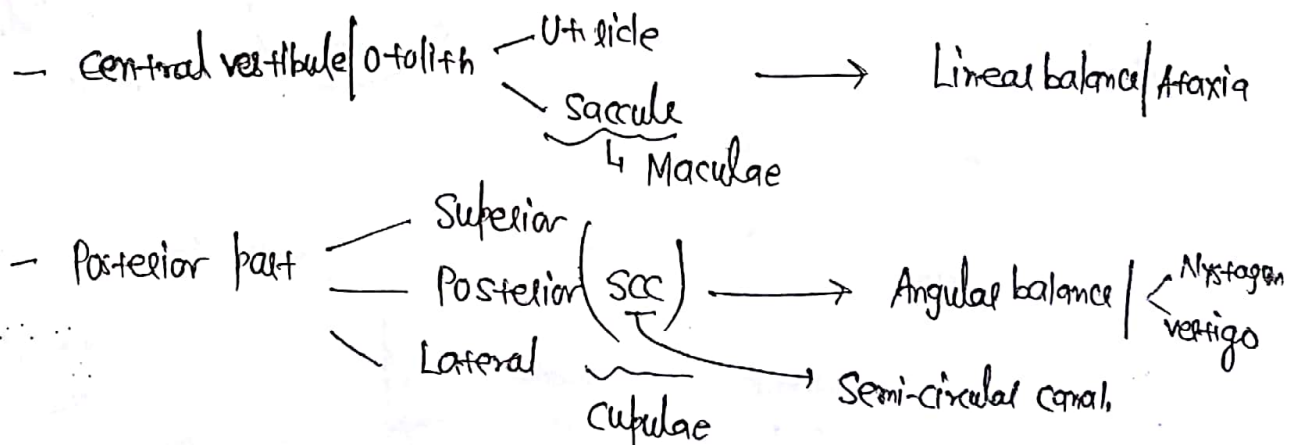
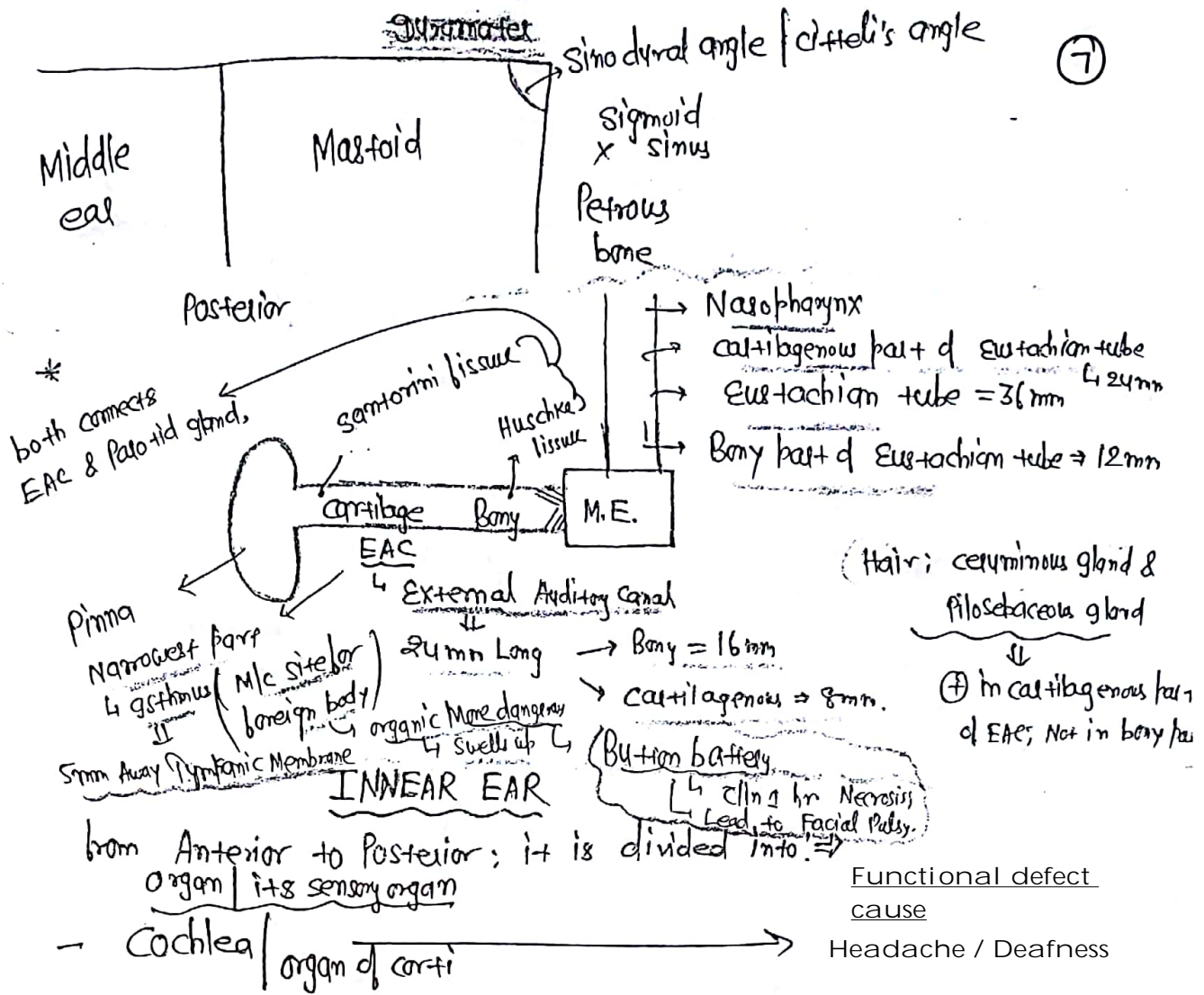
↓

Facial Nerve is Running beneath tip of
Mastoid; so; in New born Facial Nerve
is exposed

↓

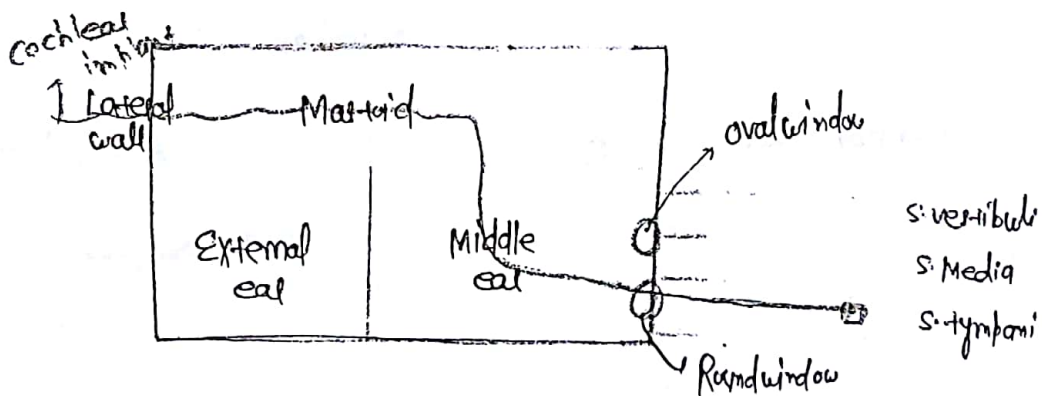
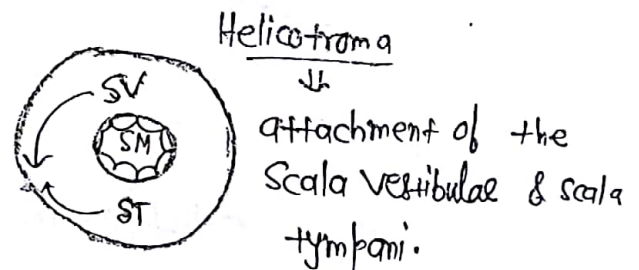
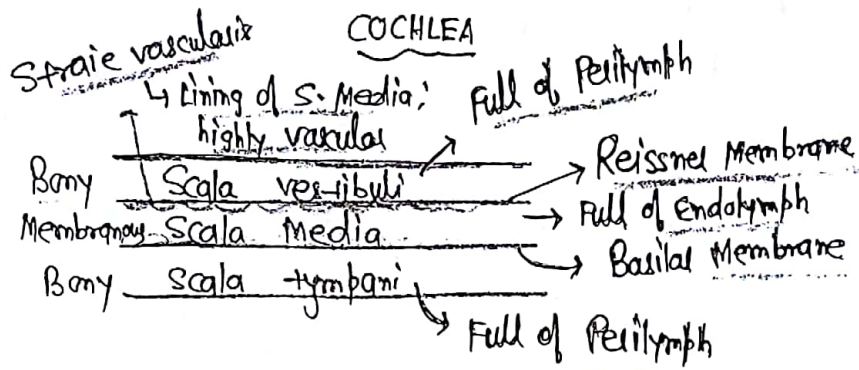
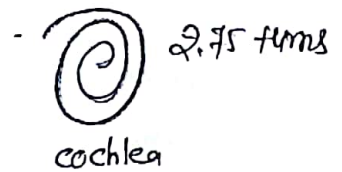
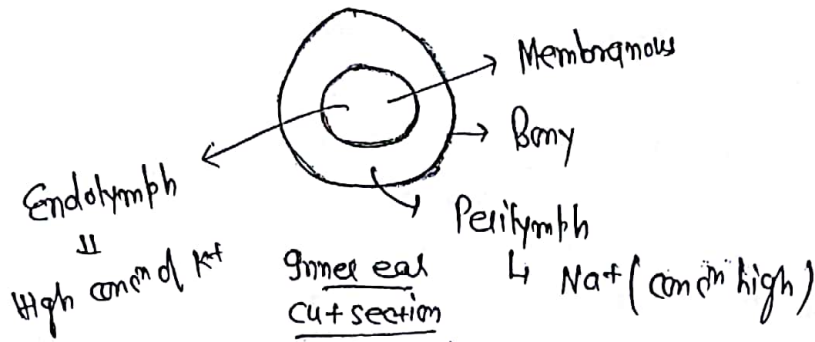
So; in New born the incision Never extends
up to the edge of Mastoid





* Ceruminous gland \Rightarrow Modified Apocrine Sweat glands.

* Cross-section of inner ear \Rightarrow



* Endolymph is an internal concept; secreted inside & absorb inside.

• Perilymph is ultra-filtrate of CSF!

(8)

• Endolymph secreting organ of inner ear \Rightarrow -

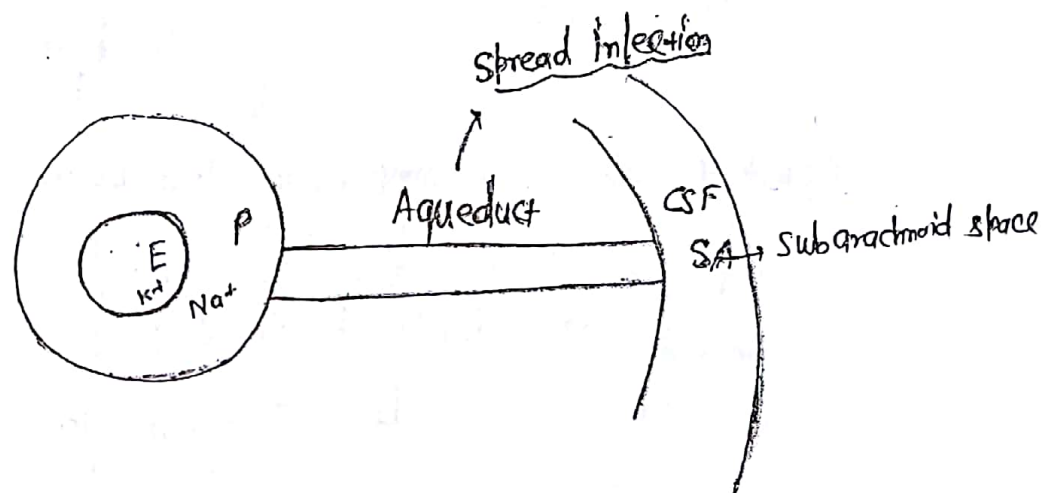
Cochlea \rightarrow Striae vascularis

Utricle/Sacule \Rightarrow Dark vestibular cell

Semicircular canal \Rightarrow Placum semilunatum

* Perilymph secretion \Rightarrow by Aqueduct of cochlea

\hookrightarrow drawback \rightarrow Infection spread



Q. Infection of inner ear goes to brain via \Rightarrow

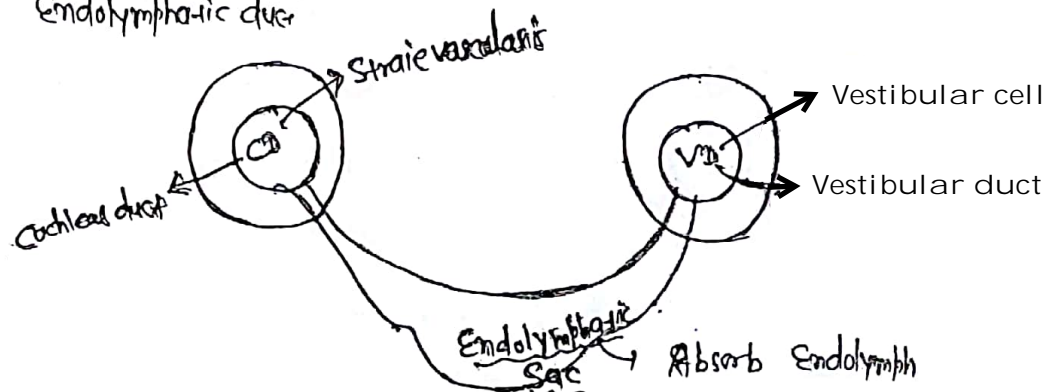
a) Cochlear duct; (Membranous part of cochlea)

b) vestibular duct;

\hookrightarrow i.e. Scala Media

c) Aqueduct

d) Endolymphatic duct



* Cochlear duct = Membranous part of cochlea = endolymph \oplus in it.
= deafness on back pressure

Vestibular duct = Membranous part of vestibule

↳ endolymph \oplus



Vestibular symptoms on pressure

Endolymphatic sac = absorption of endolymph



Located in Extradural space ^{aa}

↳ Meniere's dz

↳ if sac is defective

↳ endolymphatic hydrops.

Aqueduct \Rightarrow Communication b/w brain & inner ear



Perilymph secretion



Infection to the brain causes

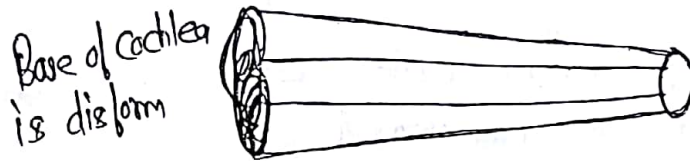
	<u>Pinna</u>	<u>Meatus/EAC</u>	<u>Middle ear</u>	<u>Vestibule</u>	<u>Cochlea</u>
Development starts (in week)	6	8	3	3	3
complete (in weeks)	20	28	30	20	20

↓
Inner ear.

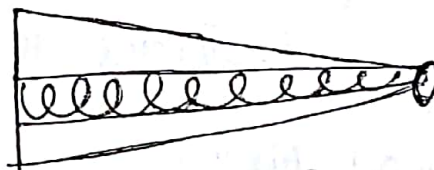
Congenital Abnormality of Inner ear

(9)

- gb cochlea takes 1.5-4mm \Rightarrow Mondini dysplasia
- gb cochlea is absent \Rightarrow Michel Aplasia
- cochlea & vestibule dysplasia \Rightarrow Scheibe Anomaly (M/c).



\hookrightarrow Alexander dysplasia



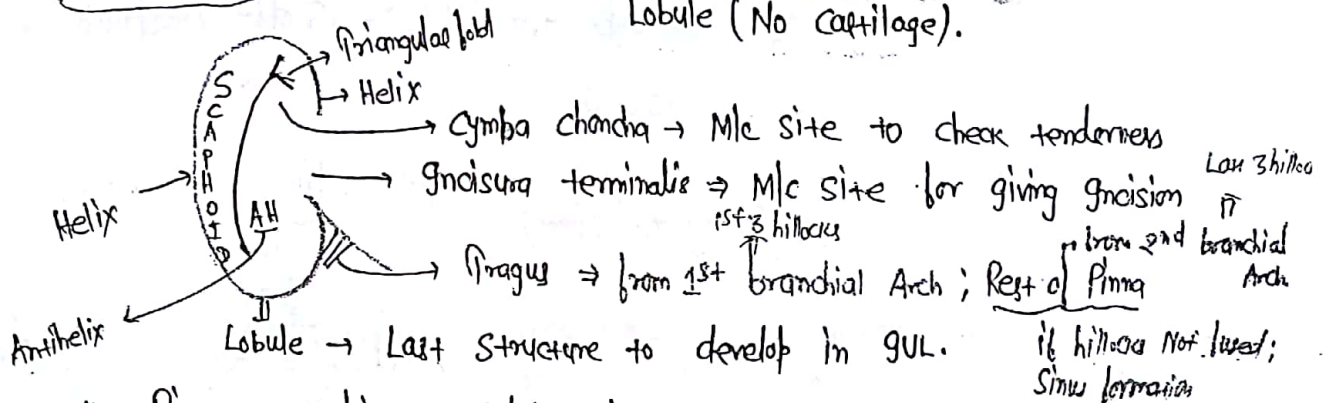
Bing's dysplasia

\hookrightarrow Membranous part gone; Not bony; So;

BAT Ear \Rightarrow Absent Antihelix
Mosaic Ear \Rightarrow Mix Antihelix & helix
Caldwell-Mohr Ear \Rightarrow Absent helix

IOC = MRI; Not CT

PINNA \rightarrow Made of yellow elastic Cartilage except :- Lobule (No cartilage).

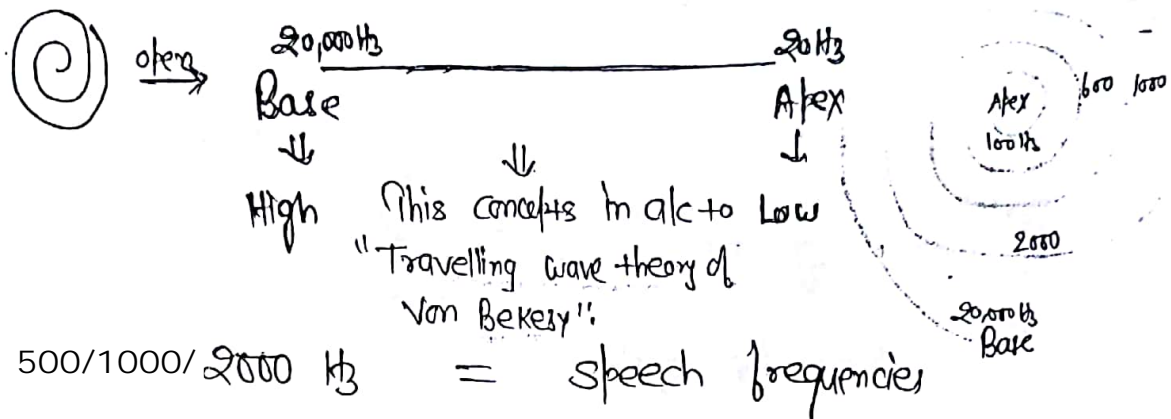


- * Pinna achieve Adult size by the age 6yr; so; No surgery below 6yr
- * Incision at Incisura terminalis is KJas \rightarrow Intel-cartilagenous incision
or
End-Aural incision
or
Lempe's incision
- * Pinna attained configuration by 20 weeks of g.u.

AUDIOMETRY

Frequency = type = Hz } both are independent
Intensity = Loudness = dB } properties of sound

Cochlea Respond to 20 Hz - 20,000 Hz



↓
Frequencies to be assessed

25 dB = cut-off Marking
= Normal threshold
= Audiometric zero

It means 30 dB threshold = 5 dB deafness

Subjective Audiometry (Asking to patient)

- i> PTA;
 - ii> speech audiometry;
 - iii> Bekesy Audiometry;
 - iv> Threshold tone decay test;
 - v> Short Increment Sensitivity Index (SISI) test.
- Detect Retrocochlear Lesion.

Objective Audiometry

↓
IXOC

disadvantage ⇒ Very costly.

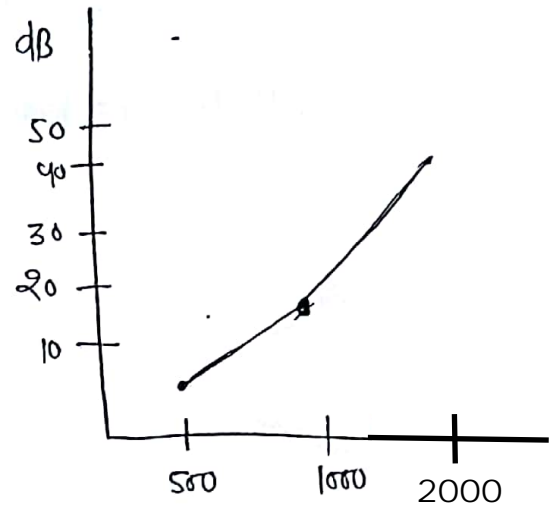
b/c No chance of Malingering in this Audiometry.

- i> Impedance Audiometry;
- ii> Evoked-Response Audiometry;

Pure tone Audiometry (PTA)

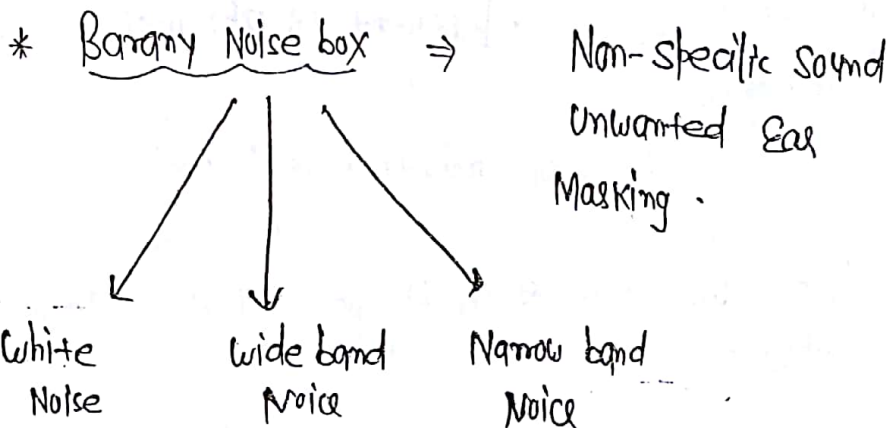
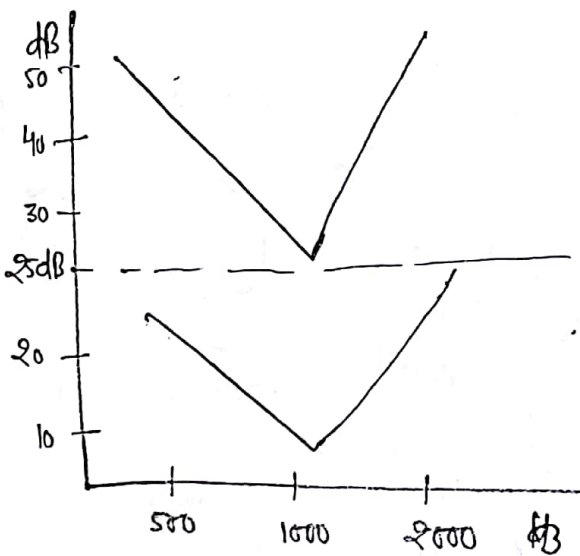
(10)

eg: 500 Hz → 5 dB
 1000 Hz → 15 dB
 2000 Hz → $\frac{40 \text{ dB}}{20 \text{ dB}}$



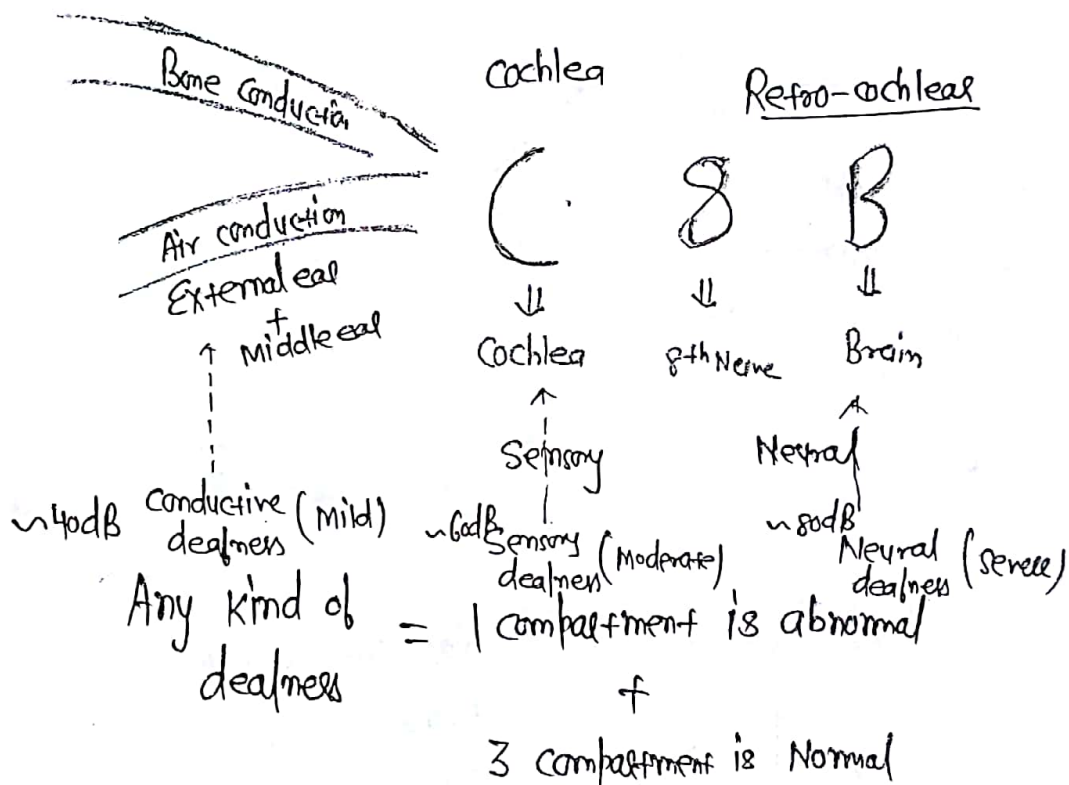
H3

Shape of graph
 least imp parameter
 it is only 25 dB
 which will decide
 prognosis



Deafness \Rightarrow Defined as patient Responding to the sound beyond 25dB.

g/ Not Response to at all \Rightarrow Dead ear



* At one time we plot a graph for separately Air conduction & Bone conduction

* Red colour graph = Rt. side
Blue colour graph = Lt. side

Audiogram key

AC (Unmasked)

AC (Masked)

BC (UnMasked)

BC (Masked)

No Response

Rt.
Ear

Lt.
Ear

11

O

X

Δ

□

<

>

[

]

↙

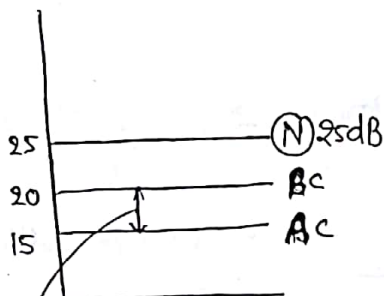
↘

Right Normal

Right conductive deafness

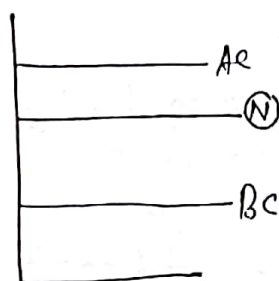
Right Sensori. deafness

Rt. Neuro deafness

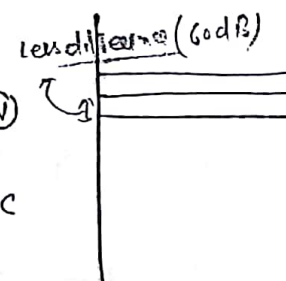


Amplification seen in it; b/c Air conduction prt.

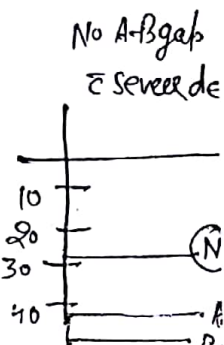
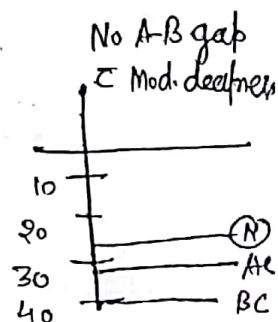
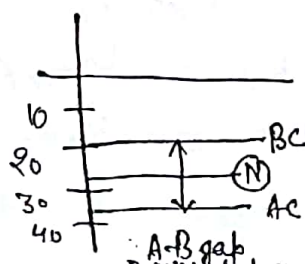
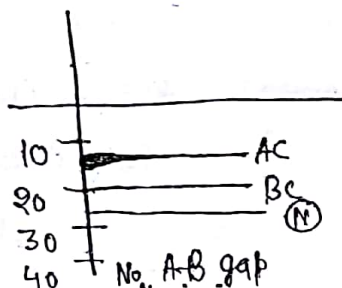
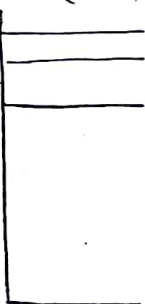
Air-bone gap.



AC Not amplify here b/c; it is defective



more difference (gdb)



$$\frac{\text{Ratio of Tympanic Membrane}}{\text{Oval window}} = \frac{21}{1} = (\text{Total Ratio})$$

$$\frac{\text{Pars tensa}}{\text{Oval window}} = \frac{14}{1} = (\text{Effective Ratio})$$

$$\frac{\text{Malleus}}{\text{Stapes}} = \frac{1.3}{1} \quad (\text{Lever action of Middle ear})$$

It Means Handle of Malleus is 1.3 times longer than long process of the Incus.

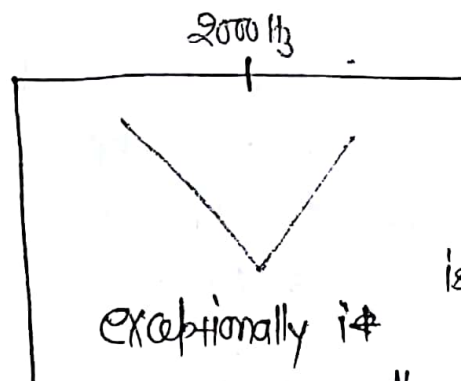
Sound Amplification = $\frac{14}{1} \times \frac{1.3}{1} = \frac{18}{1}$

OR
Middle ear transformer Ratio.

$$dB = \frac{1}{\log} \Rightarrow \text{Sound Amplification} = 5dB$$

Q.

Maxm Hearing Loss @ 2000 Hz \Rightarrow Carhart Notch



Feature of otosclerosis.

Loss should be in Air-conduction.

loss of bone-conduction.

ossicles themselves are bony in nature; they have some role in bone conduction; which is dominated in otosclerosis; hence this is a bone conduction.

* Resonance frequency of ossicles ≈ 2000 Hz; that's why this Notch

is @ 2000 Hz

(12)

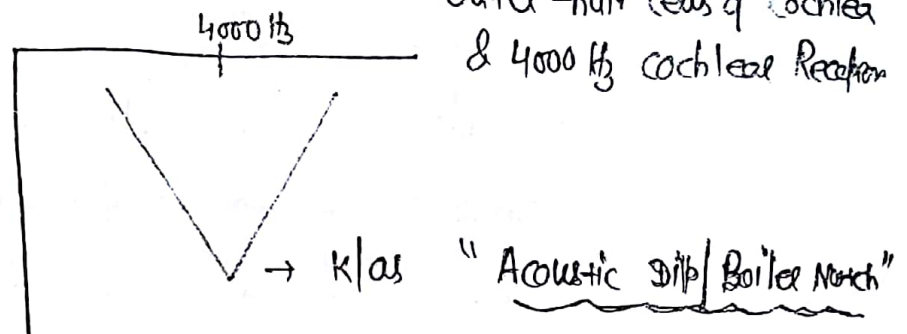
Resonance frequency \Rightarrow It is the frequency @ which ossicles gives Min^m Resistance
↓
Any Structure

* Resonance frequency of Middle ear \Rightarrow 800 Hz

Resonance frequency of Pinna \Rightarrow 3000 Hz.

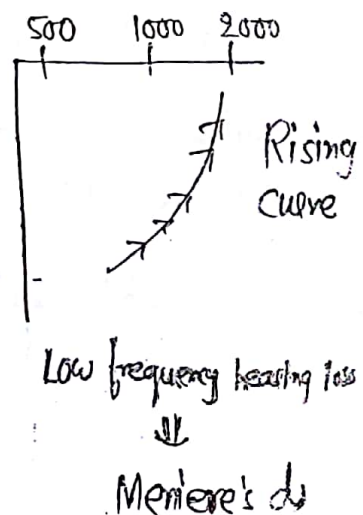
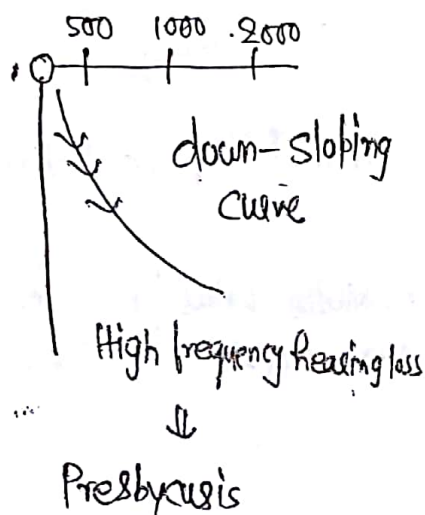
Resonance frequency of Tympanic Membrane \Rightarrow 800-1600 Hz

* In Noise induced trauma \Rightarrow b/c Noise injured the Outer hair cells of cochlea & 4000 Hz cochlear Receptor
Both AE & BC Loss.



* WHO Max^m 85 dB Intensity \Rightarrow to 8 hours in 5 days

Indian factory act Max^m 90 dB Intensity \Rightarrow to 8 hours in 5 days excess



• Capacity of PTA (Pure tone Audiometry) \Rightarrow 125-8000 Hz.

• High frequency Audiometer \Rightarrow 8000-20000 Hz

\hookrightarrow Otoxic drugs \Rightarrow Aminoglycosides
Anticancer drugs
Diuretics

\hookrightarrow Methotrexate is Not
Otoxic.

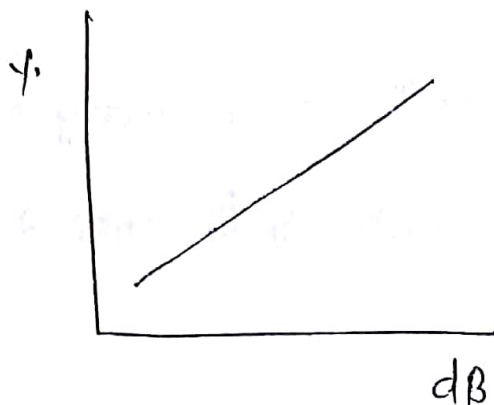
* U-shaped Audiogram \Rightarrow Congenital deafness

• Speech Audiometry \Rightarrow dB v/s % (Hz)

eg \rightarrow 10 words \longrightarrow 1 dB \longrightarrow 10%

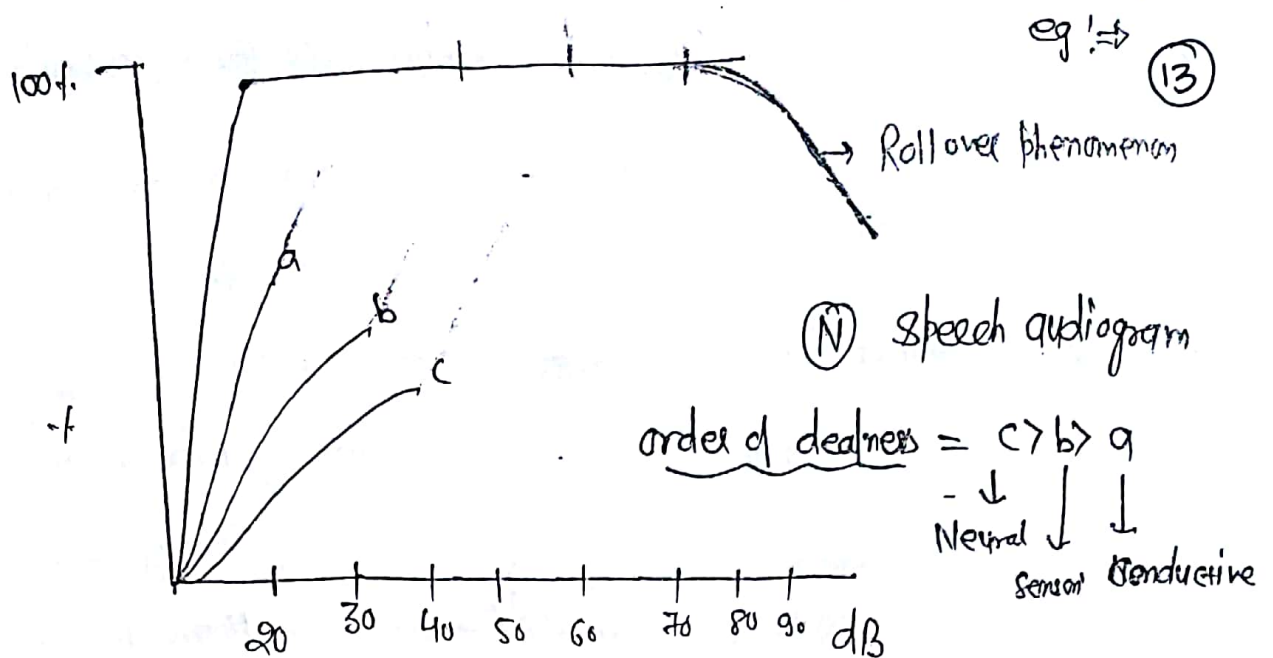
10 words \longrightarrow 5 dB \longrightarrow 30%

10 words \longrightarrow 10 dB \longrightarrow 80%



- Subject is considered to be Normal ; if he Repeats 100% words upto 25 dB sound.

- We use Monosyllable ; Bisyllable words (b/c these words are dependent on dB)
(MaMa, PaPa \longrightarrow) (MaMa, PaPa \longrightarrow)



Any Rt. Shift \Rightarrow Deafness;

Higher the Shift \Rightarrow Higher the deafness;

* In Neural patients; where 8th Nerve is already damaged on continuous stimulation; it gets exhausted and so the phenomenon of Fatiguability; get exhausted & start Repeating less percentage of words; hence; can't sustain the Plateau graph and this fall-down is k/a "Roll-over phenomenon"

test \Rightarrow Tone Decay test;

Threshold Decay test.

\Rightarrow Roll over phenomenon = Fatiguability = Decay test.

\rightarrow Decibel at which the patient Repeat 50% of the words, is k/a "Speech Reception Threshold"

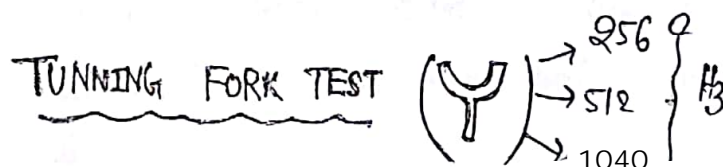
eg \Rightarrow towards \rightarrow 1dB - 10t
 towards \rightarrow 5dB - 30t
 toward \rightarrow 10dB - 50t

- * Add 30 dB to SRT & check how much % of words pt. Repeated
 ↳ klas "SDS" (Speech discrimination Score)
 ↳ Unit \Rightarrow "%":

- * Higher the Deafness ; Less should be increase
 50 % $\xrightarrow{+30dB}$ 90% (conductive deafness)
 60 % $\xrightarrow{+30dB}$ 70% (Sensory deafness)
 50 % $\xrightarrow{+30dB}$ 55% (Neural deafness)

* Neural deafness = Roll over phenomenon = very poor SDS

- * connexin 26 Mutation is involved in Non-syndromic SNHL.



Hit Slow = Less intensity

Hit Hard = More intensity

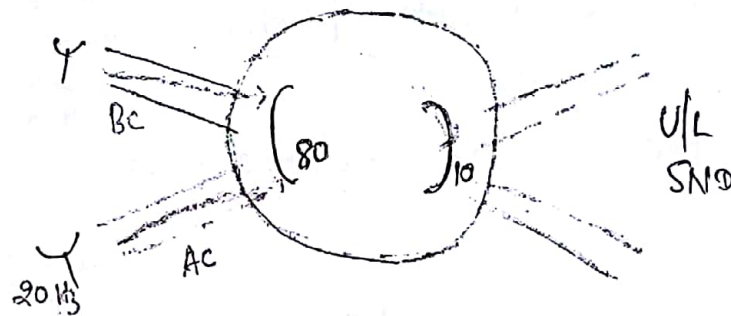
- * 512 Hz = Best heard = therefore using in ENT

- * 128 Hz > 256 Hz = Best heard = CNS (Medicine) = in Posterior column defect

* Amplification $\oplus \Rightarrow$ Rinne's $\Rightarrow \frac{AC > BC}{\oplus}$ (14)
 \Downarrow
 $(N) / (SS) / (ND)$

* Amplification $\ominus \Rightarrow$ Rinne's $\Rightarrow \frac{BC > AC}{\ominus}$
 \Downarrow

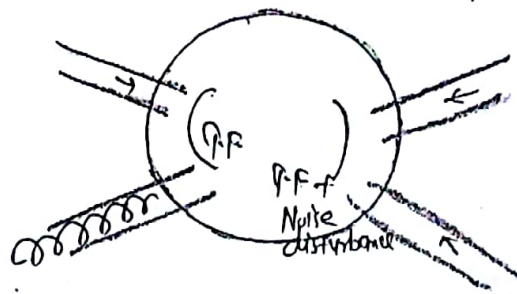
* Negative Rinne's for 256, 512 & 1024 Conductive deafness
 H_3 indicates a Minm A-B gap of 15, 30, 45 dB
eq Respectively.



\rightarrow False \ominus Rinne's \Rightarrow Severe U/L Sensory Neural deafness
 \Downarrow
 d/t Lack of Masking
 \Downarrow
 Trans cranial transmission of sound

* Weber's test \Rightarrow centralised in (N) Human being.
 Weber Lateralized to (N) ear \Rightarrow Sensory Neural deafness
 Weber Lateralized to better ear \Rightarrow B/L Sensory Neural deafness

* Weber's Lateralize to diseased ear in conductive deafness



* Weber's Lateralize to worse ear in B/L conductive deafness

* Way to crack \Rightarrow • Schwabach's or ABC (Absolute bone conduction) test \Rightarrow Pt. bone conduction is compared to the examiner.

Write the Possibility of Weber



Rule out one in the help of Rinnes

Q.

Rt. Rinnes $\Rightarrow \ominus$; Rinnes Lt. $\Rightarrow \ominus$

Weber Lateralized to Rt.



Rt. conductive deafness (Rt. ear > Lt. ear)
Lt. conductive deafness

• In ABC testing Meatus of both patient & examiner is occluded; while in Schwabach test, Meatus is Not occluded

• done in otosclerosis
• Gille's test & Bing test \Rightarrow

• done for conductive deafness

• if we block EAC & No change in hearing then it is conductive deafness.

• Both are bone conduction test

Q.

Rinnes Right $\Rightarrow \oplus$; Rinnes Lt. $\Rightarrow \ominus$

Weber Lateralized to Left



Lt. conductive deafness

+

Rt. sensory Neural deafness

Rt. Normal also

Q: Rinne's (+) \Rightarrow both ears & Weber lateralised to R+ ear. (15)

Left sensorineural deafness

+
Right (+) / sensorineural deafness.

Ans
Q:

Right \Rightarrow (+); Lt \Rightarrow (-); Weber Lateralised to right ear

Rt.
(+)

Lt
(-)

W \rightarrow R

(X) Right, conductive deafness

(X) Left sensorineural deafness

if Weber & Rinne's are Mismatch; either \Rightarrow Malingering;
Forget Masking.

* Subjective test to Raise the possibility of Malingering

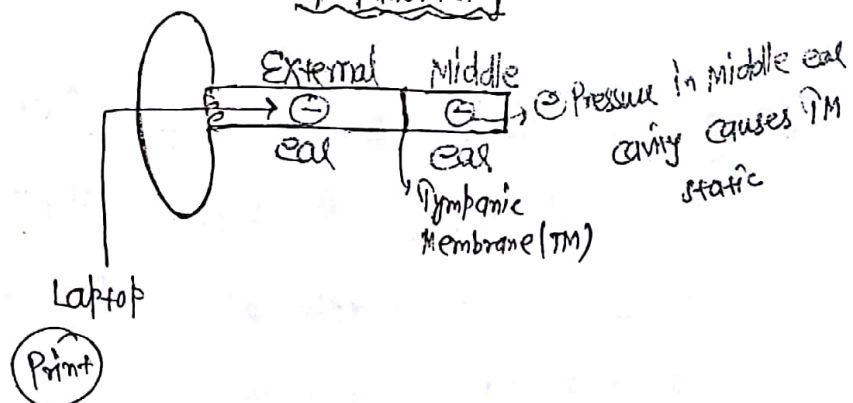
- Streenger test ; - Stapedial Reflex

- Lombard test ; - BERA

- Lee Speech Delay test

*

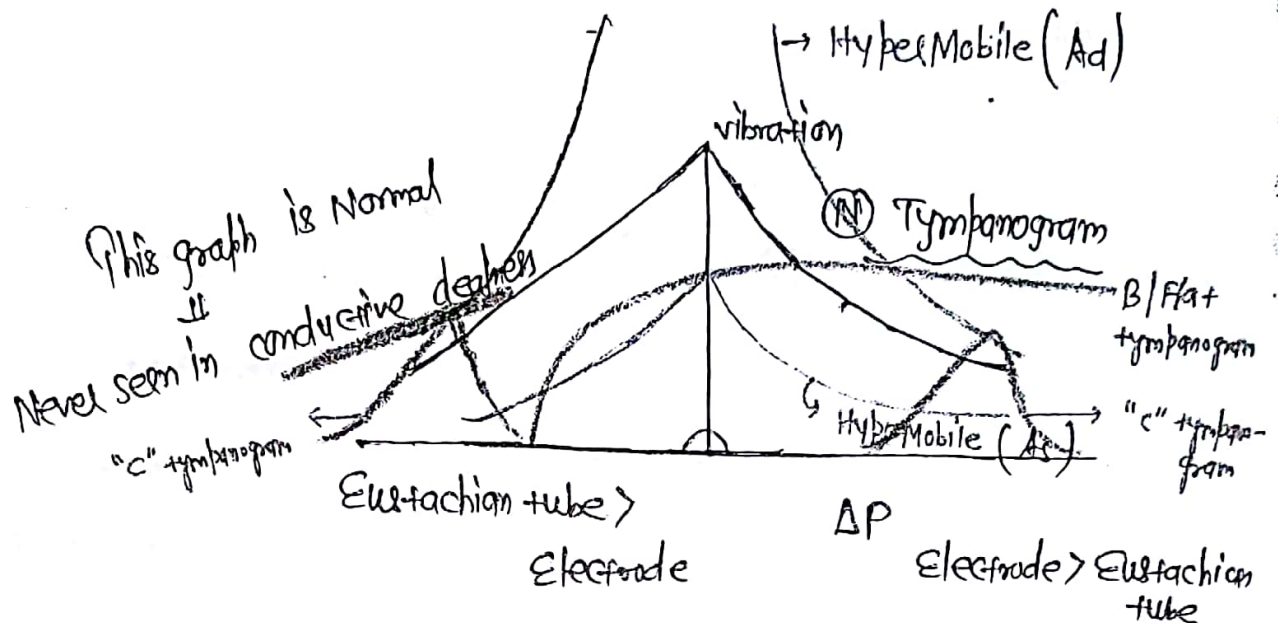
Tympanometry



$$\Delta P = 0$$

(Eustachian tube - Electrode = ΔP)

- We keep the electrode @ External auditory canal & insert a electrode And Measures ΔP and vibration of Tympanic Membrane



⇒ HyperMobile Tympanic Membrane ⇒ Thin TM (congenital) & ossicular damage

⇒ HypoMobile Tympanic Membrane ⇒ Seen in Otosclerosis, otolibrosis, Tympanosclerosis, Tympano fibrosis.

* Some other graphs ⇒

all are d/d of conductive deafness.

Perforated Tympanic Membrane = "B" tympanogram

Fluid in the middle ear = "FLAT" tympanogram

Eustachian tube dysfunction = "C" tympanogram

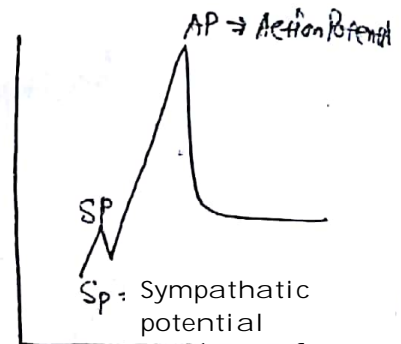
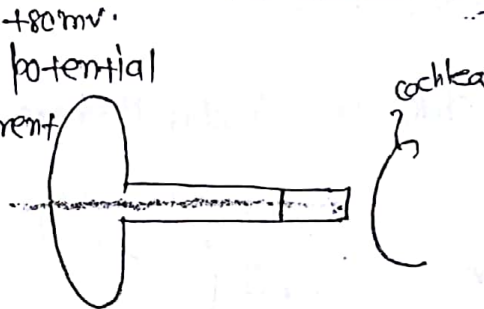
As per few books ; "β" & "FLAT" tympanogram are same (16)

* Impedance Audiometry \Rightarrow Tympanometry + Stapedial Reflex
 \Downarrow
Uses 220 Hz frequency \Downarrow
 IOC for conductive deafness

Stapedial Reflex \rightarrow Reaction time \Rightarrow 40-160ms

\Downarrow \rightarrow $> 70\text{ dB}$
 Center \Rightarrow Superior olivary complex. (Alignment of Stapedial Reflex \Rightarrow 8th CN ;
 Alignment of Stapedial Reflex \Rightarrow 7th CN)
ELECTROCOCHLEOGRAPHY Electrocochleography

* Endocochlear potential
 is direct current
 (DC) Potential
 Recorded from
 Scala media.



Invasive Route (trans-tympanic)

Laptop

electrical activity of cochlea \leftarrow Sp ≤ 0.3 \Rightarrow (N)

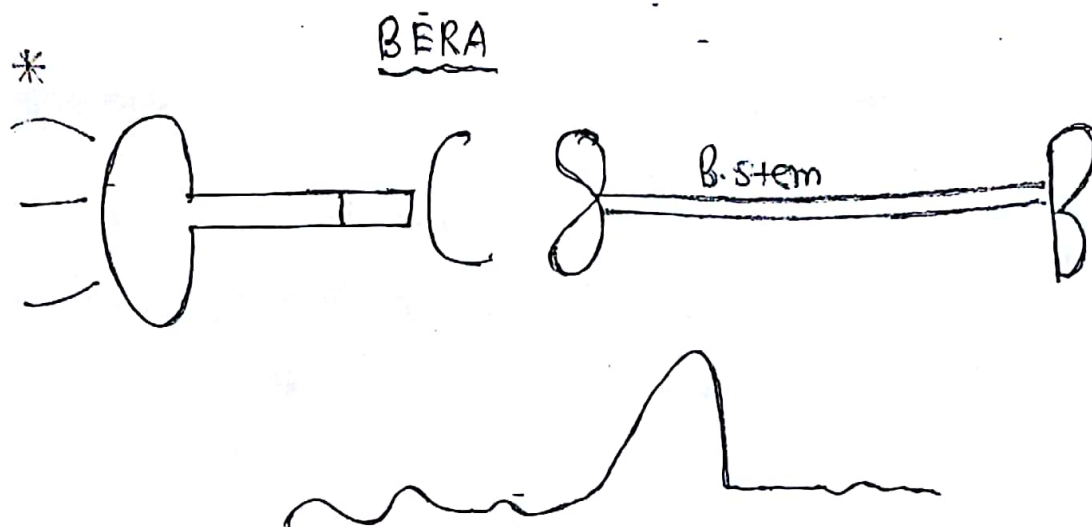
electrical activity in distal \leftarrow Ap

part of Auditory Nerve

> 0.45 \Rightarrow (ABN)

In b/w 0.3 - 0.45 \Rightarrow equivocal Repeat the invasive

3 Parameters Measured are \Rightarrow cochlear Microphonics; Summating potential;
 & Action Potential.



BERA (Brainstem Evoke Response Audiometry) / ABR (Auditory brain-stem Response)

AABR (Automatic Auditory brain stem Response)

- Investigation of choice in Acoustic Neuroma = AABR > BERA

<u>Nerve</u>	<u>Wave</u>
Eight Nerve	I, II (I → distal part of cochlear N. II → Proximal part of cochlear N.)
Cochlear Nucleus	III
Olivary Nucleus	IV
Lateral Lemniscus	V (Large wave) Latency difference ↳ 0.2-0.4 msec
Inferior colliculus	VI, VII

* BERA doesn't diagnose higher centre deafness

* CERA (Cortical Evoke Response Audiometry) for higher centre deafness.
↳ Not suitable for children.

BERA

- Recording is Made from brain stem potential
- Click stimulus is used
- Responses are Not frequency specific
- can be performed in Awake & Restless patients.
- Suitable for even young children
- Response begins after 1-10 ms after giving stimuli

CERA

(17)

- Recording is Made from Cortical potentials
- Tone stimulus is used
- Responses are frequency specific
- Pt. Must lie still through out the process
- Unsuitable for children
- Response begins after 50-300 ms after stimulation

Meniere's disease ^{Age \Rightarrow 30-40 years} (Common in Males)

- Endolymphatic hydrops \Rightarrow Secretion & less absorption
- Moderate deafness (60dB)
- Low frequency hearing Loss:
- Rising curve
- Speech audiometry graph \Rightarrow Right shift
- Plateau @ 60dB. (Sometime b/c of Recruitment phenomenon; patient can't touch the plateau)

Roll over phenomenon ; Decay test $\Rightarrow X$
also Mutation in short Arm of chr. 6

~~Poor~~ SDS

Rinne's \oplus ; Weber lateralized to better ear,

GOC \Rightarrow Electrocochleography (>0.45)

U/L in Nature;

Otosclerosis \Rightarrow B/L ; (Common in Female)

three hallmark feature of Meniere's \Rightarrow Tinnitus (T)
 \downarrow
Vertigo (V)
 \downarrow
Sensory deafness (S)
 \pm
Fullness of ear.

* Fluctuating deafness

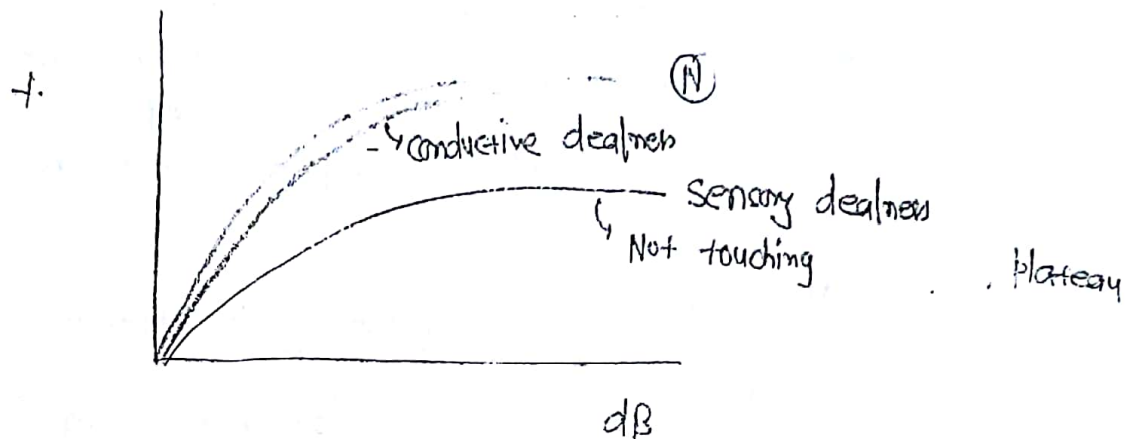
* Reverse symptom of Meniere's \Rightarrow Lermoyez syndrome
(S \rightarrow V \rightarrow T)

* T + V + S + Drop Attack / Ataxia \Rightarrow Tumarkin crisis.

* \uparrow vertigo in Loud sound \Rightarrow Tullio phenomenon

\downarrow
b/c of Inner ear is more sensitive,
or there is communication b/w Middle ear

- * Every sensory patient is oversensitive to 1 dB \uparrow es in intensity; this oversensitivity is known as "Recruitment phenomenon". (Pt. is discomfort on rising 1 dB from 60 dB;



- * False perception of two frequency; when the source is giving one \Rightarrow k/as "Diplacusis"
 \hookrightarrow b/c different Refractive Index in both ear

- * M $\left\{ \begin{array}{l} \text{Meniere's} \\ \text{Malignant otitis externa} \end{array} \right\}$ both have Medical Ill.

R_x \Rightarrow Low Salt diet



Labyrinthine Sedatives (eg \Rightarrow Dimenhydrinate; Prochlorperazine; Promethazine).

- Positive pressure therapy \Rightarrow to compensate the internal pressure; we give external pressure via grommet insertion
 \Downarrow
 from "Meniere device".

* Nicotinic Acid is (50mg) vasodilator of gmmel ear.

$\text{Na}^+ - \text{K}^+$ ATPase

Very Rarely we operate the patient

Glycerol test

↳ endolymphatic sac decompression,

Shunt Surgery drain into G.T.V.

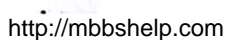
Cody Sx

Internal jugular vein,

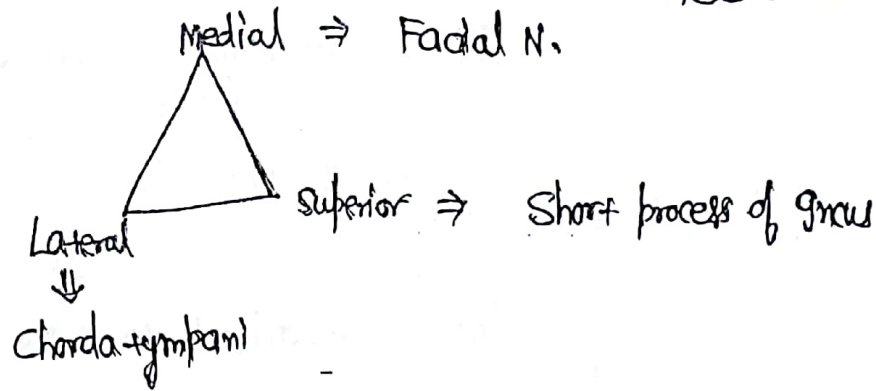
米

- Endolymphatic Sac decompression \Rightarrow Gonaladson Line

To enter Posterior cranial fossa \Rightarrow Trautman's Δ



* Facial Recess is used for Posterior Tympanotomy.



* Paracusis willisii => Improvement in the ability to hear conversation in the presence of loud background noise
 Seen in Otosclerosis

Common in Females (In India => Common in Males)

Otosclerosis (Foot plate of stapes involve)
 ↓
 conductive deafness

= Mild deafness (40 dB) → Air-bone gap (+)
 ↓

Cahal + Notch

↓
 Seen in Bone conduction

= Right Shift on Speech Audiometry

= Plateau: @ 40 dB

= Good SDS

= Roll-over phenomenon
 Decay test
 Recruitment phenomenon
 SISI (Short Increment Sensitivity Index)
 ↳ test for Recruitment phenomenon

XX

* Recruitment phenomenon test,

↳ Short Increment Sensitivity Index
(SISI)
↳ 70-80% sensitivity

* Rinnes \ominus ; Weber lateralized to worse ear;

* IOC \Rightarrow Impedance Audiometry
↳ As graph.

* Rx \Rightarrow Stapedectomy
↓

New Rxoc \Rightarrow Stapedotomy

* Changes after surgery \Rightarrow ① Tympanogram becomes Ad!
② Carhart Notch disappears.


* Autosomal dominant | Hereditary cause is Most imp. cause.

* H/O Pregnancy pointed towards otosclerosis.

* Otosclerosis + Blue sclera + Osteogenesis Imperfecta

↓
✓ Vanden hoeye Syndrome

- * HPE findings are same in otosclerosis & osteogenesis imperfecta. (20)

- * Middle ear cavity
- * Malleus Incus Stapes
- 
- ↓
- M/c site of otosclerosis
- ↓
- actual disease starts from here
- * Otosclerosis is klas "Fistulae Anterior Fenestrum"
- ↓
- klas "Otospongiosis".

- * Early stage of otosclerosis ⇒ Inflamed = Reddish = Schwartz /
 foot plate Tympanic Membrane Flamingo
 Pink sign
- ↓ it is ⊕

No Surgery; b/c of Acute
 inflammation; bleeding more;
 to Reduce it; 1stly give NaF

↓

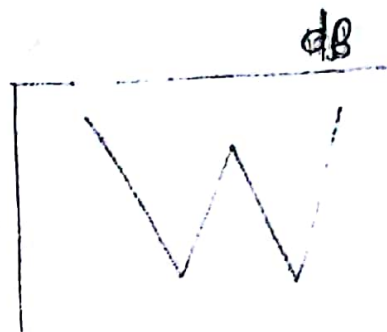
Replace Sclerotic focus
 from Normal bone by res
 Osteoblast & res Osteoclast.

- * It is a/w Measles (otosclerosis)
- Sensori Neural deafness is a/w Mumps
- Conductive deafness is a/w CMV

- * In 99% cases Otosclerosis it affects Footplate ;
In 1% affect cochlea.



- No A-B gap
- No Carhart Notch
- See "W" shape graph on PTA



Klas "Cookie bite Audiogram"

- * Robinson's Prosthesis is Related to otosclerosis
(Buckle-handle Phenomenon)

- * Gelle's test → No change in hearing through bone conduction ; when Air pressure of ear canal is test by Siegel's speculum. ⊕ in osteosclerosis.
- * Gelle's phenomenon → ⊖ in otosclerosis.

* ACOUSTIC NEUROMA

Trick → Feeble voice = conductive deafness
Loud voice of Patient = Sensory Neural deafness

⇒ Most Common CP Angle tumor



Result in Neural deafness

Ixoc = BERA

↳ I & II wave Impaired, (Initially)
Later on all the waves will be impaired.

* changes of Vth wave is easily appreciated (21)
↳ Inf. vestibular Nerve

* Soft tissue tumor

↳ IOC \Rightarrow Gd-enhanced MRI



↳ ice-cone appearance of CP angle

* ice-cone appearance of middle ear is (2) finding.

* TxOC \Rightarrow Surgery

↳ pt denies

Y-knife Radiotherapy

* Antoni classification $\left\{ \begin{array}{l} \text{Antoni type-A cells} \\ \text{Antoni type-B cells} \end{array} \right\}$ sens.

* It causes pressure symptom on all Nerves except \rightarrow Ist & IInd

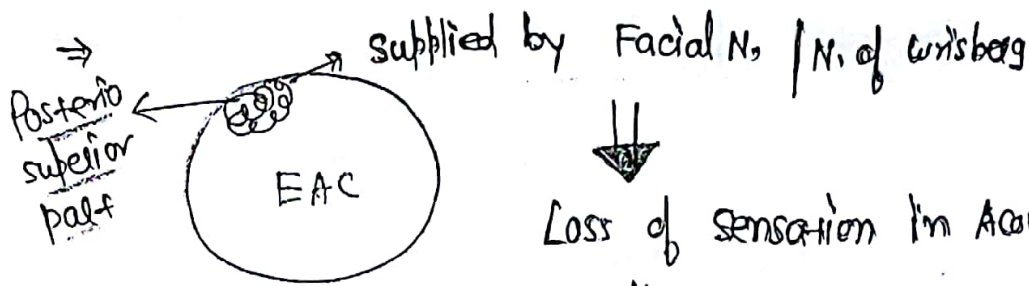
* earliest Nerve to be involved \Rightarrow Vth Nerve



Facial N. is Resistant to pressure ; Involve very late



Whenever Involved ; sensory fibres are involved first.



Loss of sensation in Acoustic Neuroma

"Heibelbergel sign"

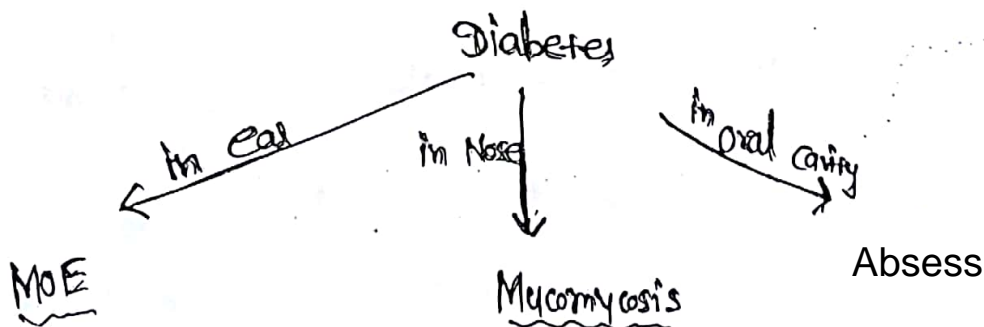
Q. Which is earliest involve in Acoustic Neuroma?
 a) Vth N. b) VIth N. ; c) VIIth CN. ; d) VIIIth CN

* ear discharge \bar{c} (N) Tympanic Membrane
 \hookrightarrow Otitis externa

* ear discharge \bar{c} Any change in Tympanic Membrane
 \hookrightarrow Otitis Media

Malignant otitis externa

\rightarrow Osteomyelitis of skull base



\rightarrow Ear discharge \bar{c} Normal TM \bar{c} granulation in the EAC
 \bar{c} facial Nerve Paralysis \equiv Malignant otitis externa

IOC \Rightarrow

Tc99 Scan = Diagnosis

(22)

Gallium Scan = Prognosis

\hookrightarrow Costly ; so we ESR for prognosis



2/In 2 weeks ESR comes down
It means Pt. is Responding.

Stage I \Rightarrow

Symptoms \oplus ; Tc99 \ominus

Stage II \Rightarrow

Symptoms \oplus ; Tc99 \oplus

Stage III \Rightarrow

Stage II + Cranial N. Palsy

M/C Nerve = 7th Nerve

IIIa \Rightarrow Single
N. Involved

IIIb \Rightarrow Multiple
N. Involved

Stage IV \Rightarrow

Stage III + Intracranial complication

* Mx \Rightarrow

Mainly Pseudomonas Involved



Give 3rd gen. cephalosporin > Penicillin > ciproflox



If Pt. is Resistant to cephalosporin then
Go for ciproflox; Not Penicillin

* Sx \Rightarrow

Debridement of granulation tissue.

* Pseudomonas causes \Rightarrow Malignant otitis externa,
 if the wound \oplus Generalized otitis externa,
 if the wound \oplus Perichondritis (Inflammation of
 Pinna \neq N.E.A.C.)
 CSOM.
 Diabetes
 Gushing/Bruit

* All E.N.T. Infection caused by "Streptococcus"
 except Frunkle in canal by "Staphylococcus" & above
 condⁿ by Pseudomonas.

* Pinna Inflamed \neq granulation in the canal \neq Black discoloration
 of the skin
 \hookrightarrow Osteomyelitis of skull base
 \hookrightarrow Malignant otitis externa

* Pinna inflamed \neq (N) External Auditory canal
 \hookrightarrow Perichondritis

* Helix is M/c involved in "Apple Jelly Nodule"
 of Pinna

Osteoma of the canal
 Benign tumor of skull base

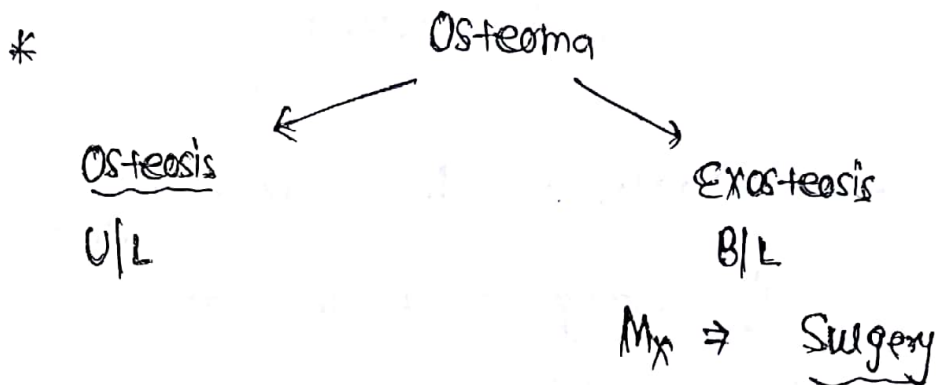
Frontal Sinus > Ethmoidal Sinus > Maxillary Sinus > Mandible > Temporal Bone

M/c site \downarrow \Rightarrow External Auditory

* Cyster and Swimmer Involved in External Auditory canal osteoma b/c water & Air hits. (23)

* Swimmer ear \Rightarrow diffuse Otitis externa

* Surfer's ear \Rightarrow Osteoma in EAC



* Keratinosis obturans

- Growth Abnormality
- Squamous cells in External Auditory canal,
- Young-age (5-20 years) affected; always B/L;



- Direction of growth of squamous cells changes from centrifugal to centripetal.

- Symptom \Rightarrow Obstructed canal

\downarrow
clean e / acetic acid

* if Not Responsive ; after 1.1. Acetic acid
 ↳ do Canaloplasty

* Boxer's ear | cauliflower ear
 ↳ Multiple Hematoma

* Tx ⇒ Conservative Management,

- if coming in Acute stage

↳ do Incision & Pressure bandage

* If Osteonecrosis ⊕ ⇒ Cholesteatoma

if Osteonecrosis ⊖ ⇒ Keratosis obturans

	<u>Keratosis obturans</u>	<u>Cholesteatoma</u>
Age →	Young, Adult	Elderly
<u>Systemic association</u> →	Sinusitis; Bronchiectasis	None
<u>Pain</u> →	Acute; Severe	Chronic; dull
<u>Hearing Loss</u> →	Moderate; conductive	Little or None
<u>Otorrhoea</u> →	Rare	Frequent
<u>Lateroligation</u> →	Usually B/L	Usually U/L
<u>Bony erosion</u> →	Circumferential	Localized
<u>Mental skin</u> →	Intact	Focal Ulceration
<u>Osteonecrosis</u> →	Absent	Usually ⊕

Infection to Middle ear

(24)

Qa 1 week old child; cry; O/E Allergic Rxn on Tympanic Membrane



Allergic Otitis Media (from Milk).

↳ via Gelfachian tube (Angle 10°)

↳ b/c it is shorter (1416)
wider
Horizontal
18mm

Baby have Recurrent attack
of Allergic Rxn occur
if Mother Not follow Advice



TxOC ⇒ Advice to feeding in Upright position.

↓
Resulted into the "Otitis Media"

Otitis Media

Secretory Otitis Media



"Klau" Secretory Otitis Media
"Glue ear"

Excessive Fluid in Middle ear

- Bulging Tympanic Membrane
- No Reliable Markers
- No Fever
- No Congestion

- Age → 6 months - 6 years

- Give → A → Antibiotics
A - Analgesic
A - Anti-allergic

• Least Important to give Antibiotics; b/c it is only for prophylaxis.

* if pt Not Response

Myringotomy

(Small Radial incision @ Antero-inferior)

if pt doesn't Respond for 3 Months
Grommet's Insertion (It expells itself; after 6-12 months)

Acute Suppurative Otitis Media



Mucus + Pus in Middle ear

- Age → 6 months - 6 years
- Bacteria → Streptococcus (M/C)
- Severe Bulging
- No Reliable Markers
- High grade fever
- congested tympanic Membrane (Catt-wheel Appearance)



- Stages of ASOM →

- Stage of Tubal occlusion;
- stage of Pre-suppurative; (Catt-wheel Appearance)
- stage of suppurative; Light-house sign
- stage of Resolution;
- stage of complication

Light-house sign
↓
b/c bulging TM Reflect the light very much.

- Rx → Antibiotics
Analgesics
Anti-allergic

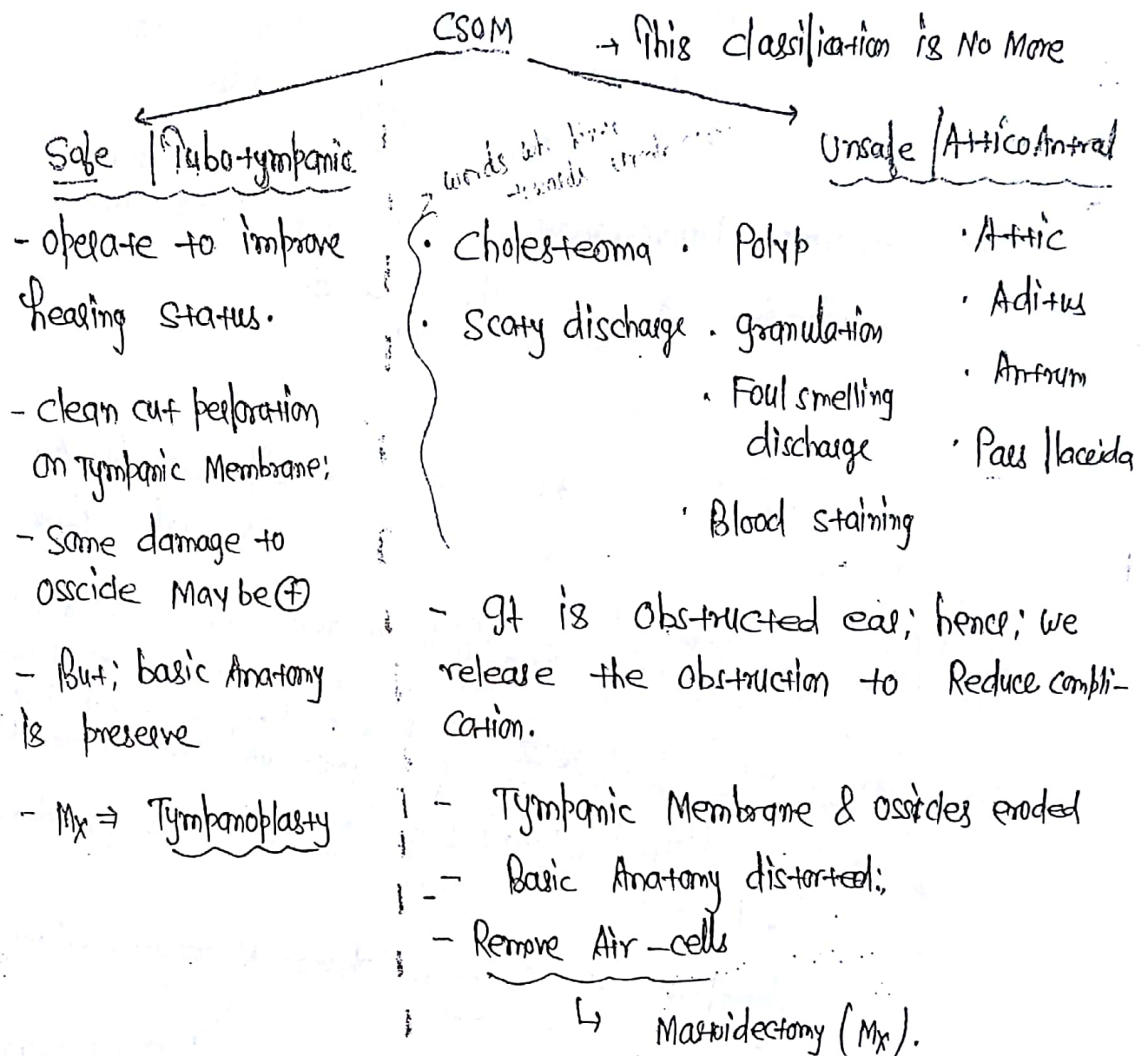
if pt doesn't Response

Myringotomy (Circumferential incision)
↳ Grommet C/I (No Foreign body inserted)



Chronic Suppurative Otitis Media (CSOM) (25)

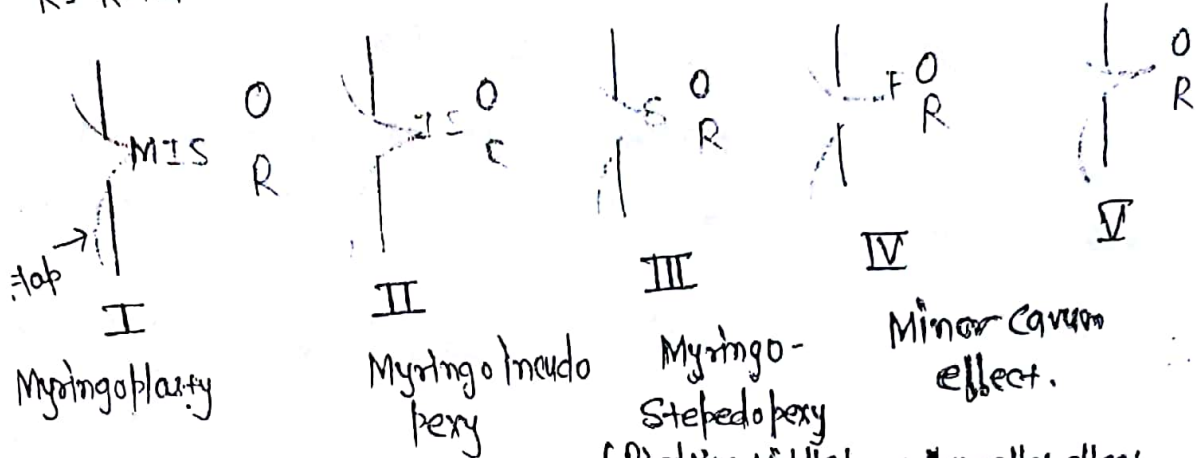
- Ear discharge + Perforation
- If ASOM Not Resolve after Myringotomy; Overbulging of Tympanic Membrane; Perforate Result in Ear discharge



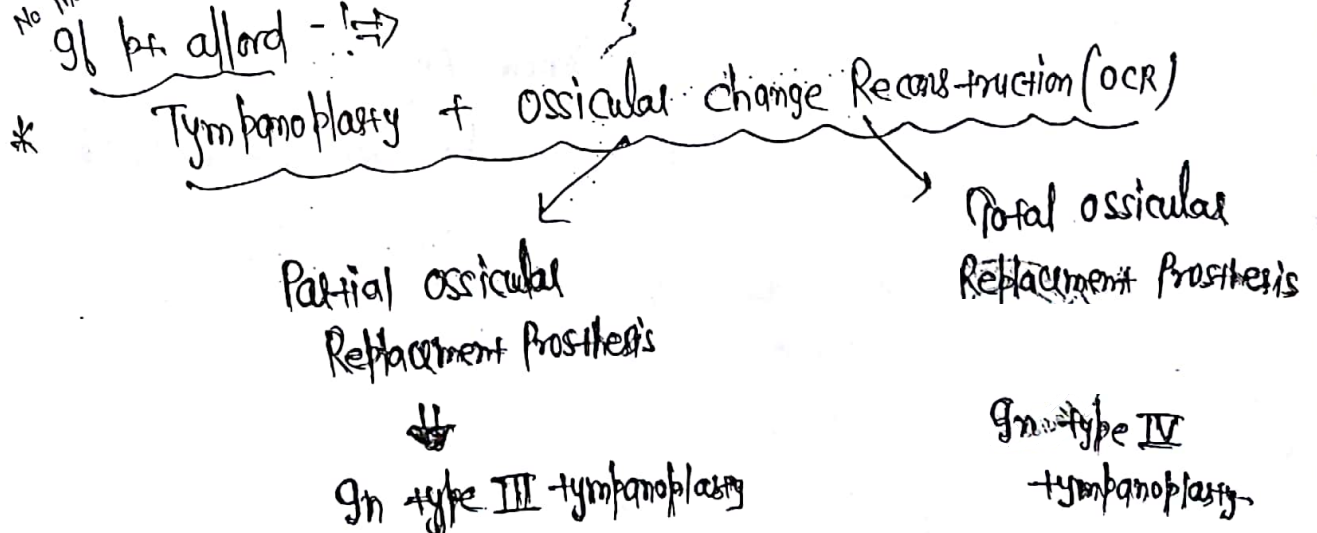
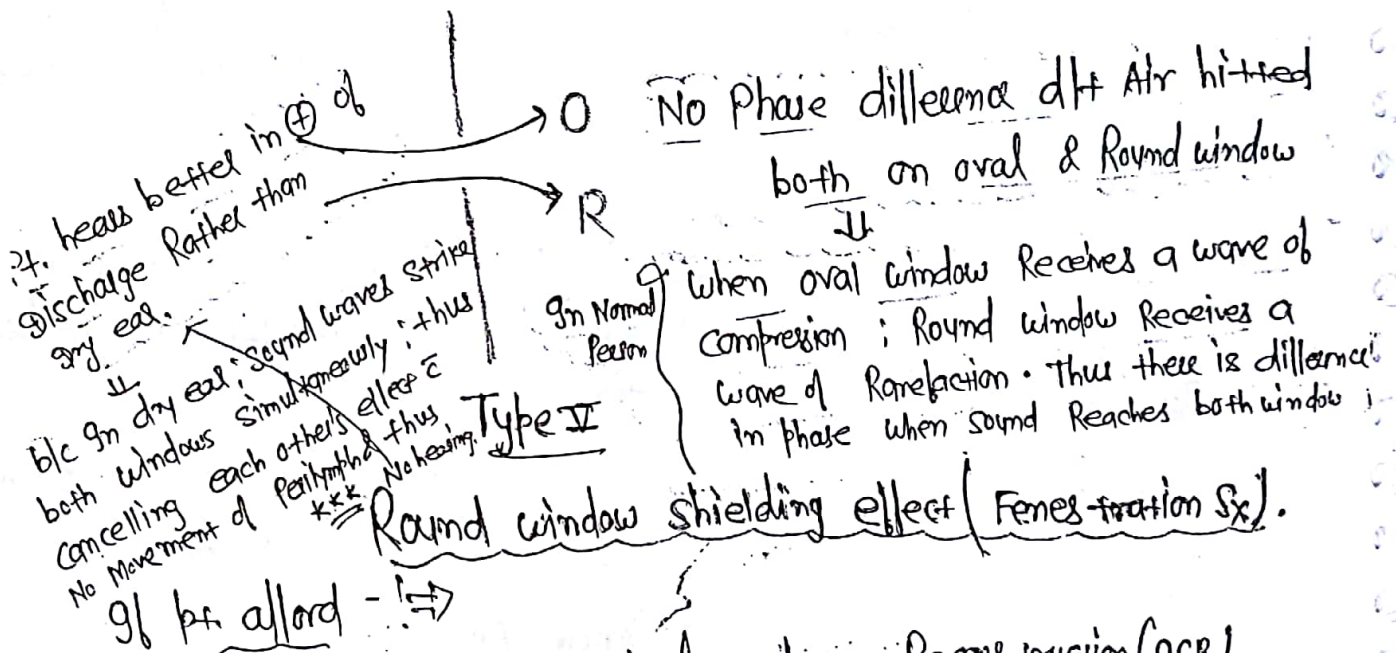
O = Oval window.
R = Round window

Tympanoplasty

M = Malleus S = Stapes
I = Incus F = Foot plate



No hearing improvement after tympanoplasty, but it is cost effective & do the ear dry.



* M/c complication of Tympanoplasty \Rightarrow Residual Perforation (26)



↓ Sleeping down of graft

Blunting of graft.

* Austin Kartush classification \Rightarrow

Group A \Rightarrow Malleus & stapes (+)	Group B \Rightarrow Malleus & Foot plated stapes (+)
Group C \Rightarrow Malleus (-) & stapes (+)	Group D \Rightarrow Malleus & stapes suprastructure Absent.
Group E - ossicular head fixation ^{three} ossicles (+)	
Group F - stapes fixation.	

Mastoidectomy (Mx of Unsafe ear)

* Open Lateral wall of Mastoid



cleaning - the Mastoid cavity



entering the Middle ear from Aditus

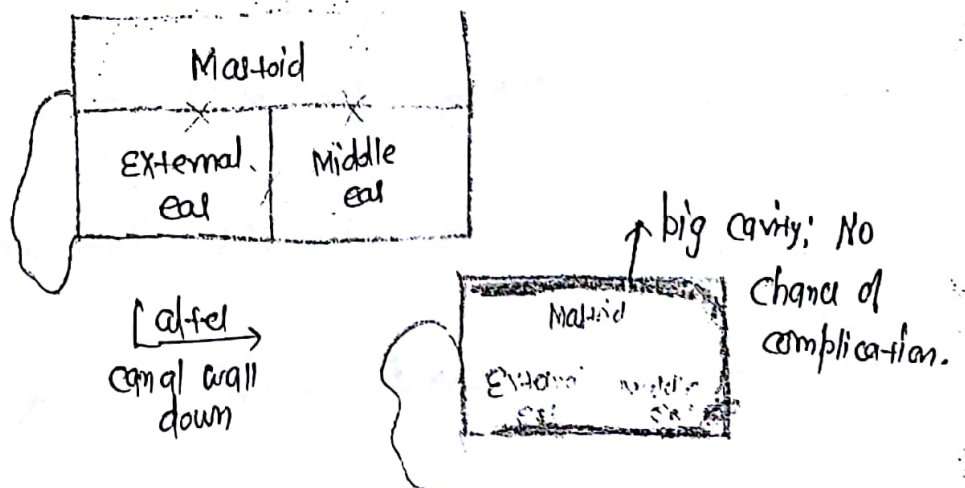
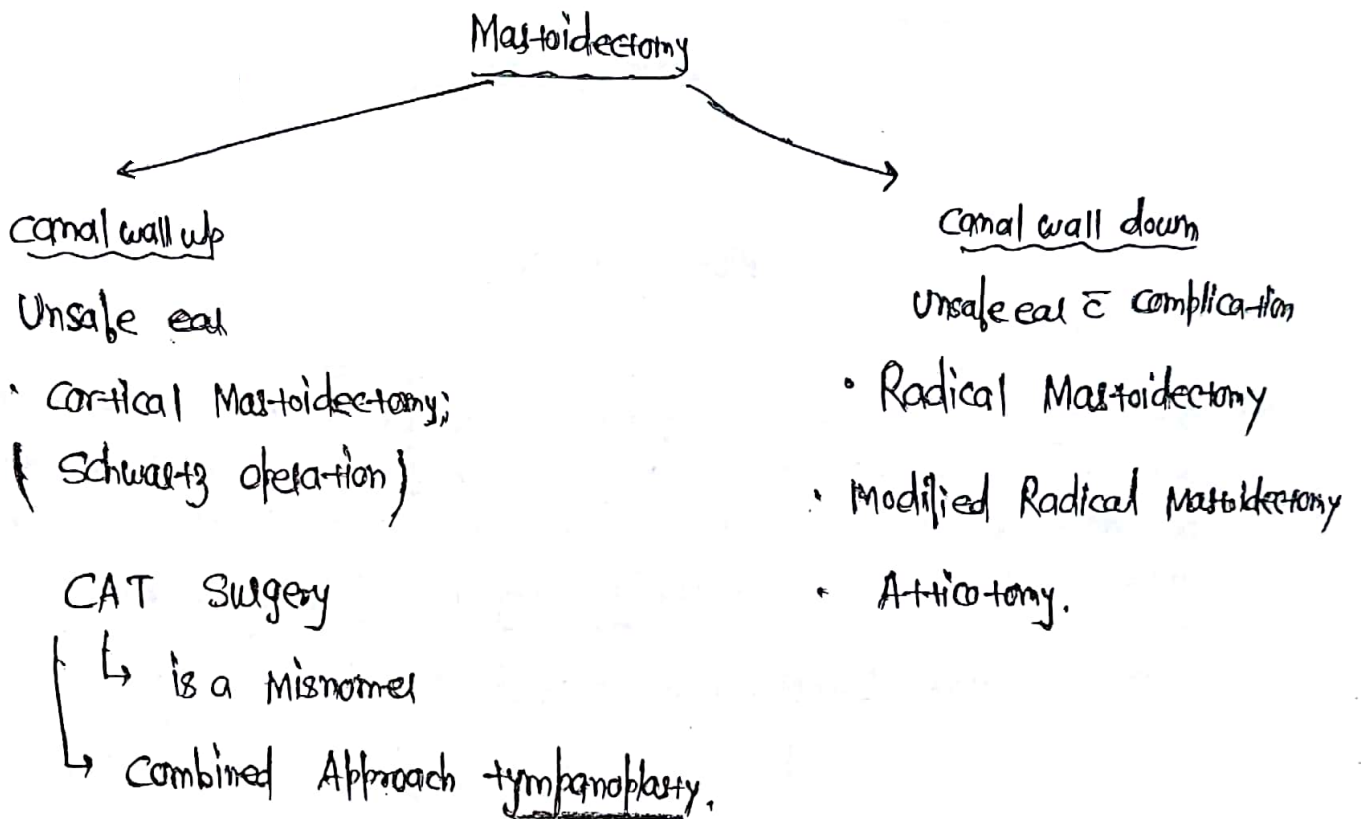


clean epi; Meso; Hypo-tympanum



avoid keeping the graft (to Release out pus).

- * • Serous Otitis ^{Disease} Media & ASOM \Rightarrow Myringo-tomy ;
- Safe ear \Rightarrow Tympanoplasty ;
- Unsafe ear \Rightarrow Canal wall up Mastoidectomy
- Unsafe ear \bar{c} complication \Rightarrow Canal wall down Mastoidectomy



* complication of Unsealed \Rightarrow ① Intracranial complication \Rightarrow

② Extracranial complication

L Mastoiditis (M/c; also overall)

M/c symptom = ear discharge

M/c sign = tenderness

* Groining of the Mastoid = earliest sign

* Sagging of the canal = Hallmark sign

L Posterior wall of EAC

hanging down (after inserting otoscope)

* Bezold Abscess \Rightarrow Pus Along SCM Muscle

Citelli's Abscess \Rightarrow Pus Along Diaphragm Muscle

Luc's Abscess \Rightarrow Pus Along canal (EAC)

Post-auricular Abscess \Rightarrow Abscess behind Pinna

\rightarrow Brain Abscess

L Temporal Lobe

\rightarrow Extradural abscess

L No New symptom is added

\downarrow

"Silent" complication

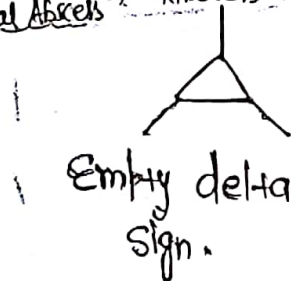
— Subdural abscess

— Otic hydrocephalus (Rare)

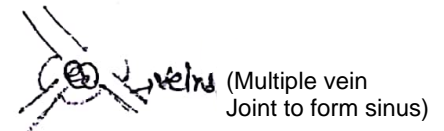
Ear $\xrightarrow{H_2O}$ \uparrow ICT

\rightarrow drastically Reduces after i.v. administration

— Lateral Sinus thrombosis



on CT scan



• Oedema over Mastoid

L Greisinger sign

Retinal vein full of blood

L Crowe Beck sign

No res in ICT on pressing jugular vein

③ Facial Nerve Palsy

L Tympanic part Involved

④ Labyrinthitis

L Lateral SCC Involved

CSOM (M/c)

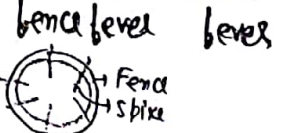
stimulated in caloric test

Medial to Mastoid

also seen

L Spiky fever = Picket = Hectic

\parallel in Malaria



- * Grommet's Insertion \Rightarrow Inserted after 3 Month
- Traumatic Perforation \Rightarrow healed after 3 Month
- Laryngeal development \Rightarrow completed by 3 Months
- Chronic Sinusitis \Rightarrow defined as > 3 Months
- Deaf Newborn \Rightarrow Should be Diagnosed by 3 Months.

⑤ Petrous apex Involvement

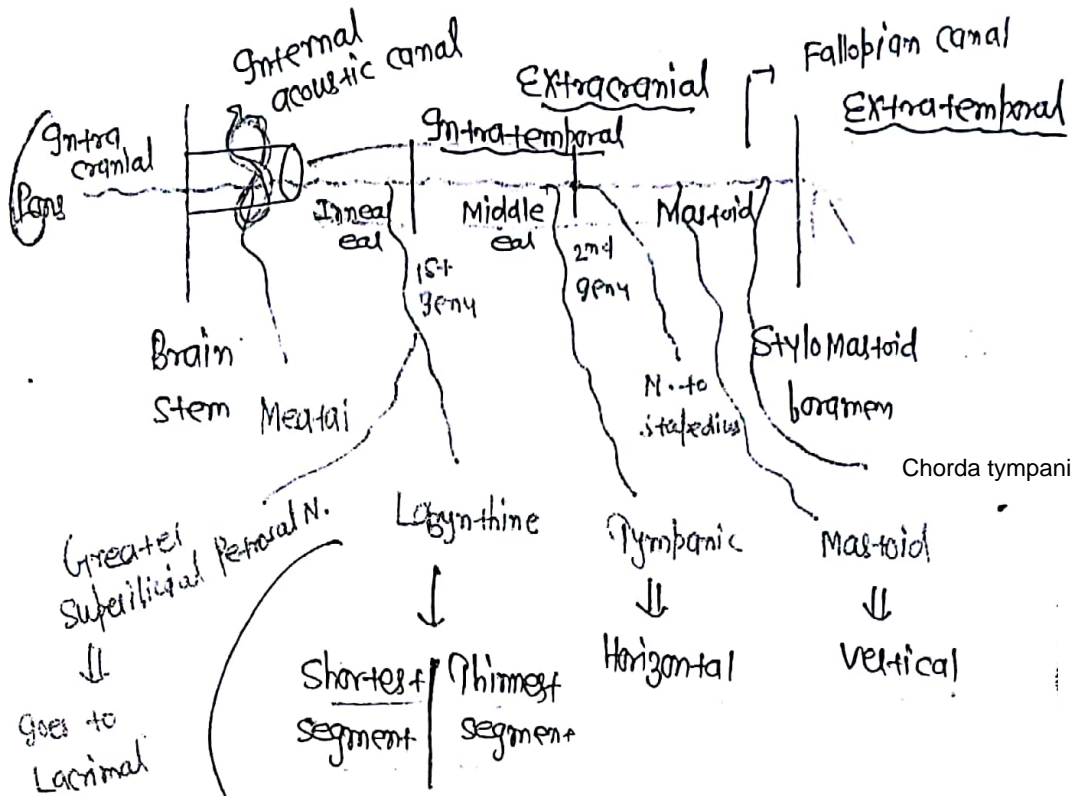
\searrow Gradenigo Δ (Ixoc \Rightarrow HRCT temporal bone)

\Downarrow

Ear discharge	+ 5th Nerve Palsy	+ 6th Nerve Palsy
	\Downarrow	\Downarrow
	<u>Pain</u>	<u>Diplopia</u>

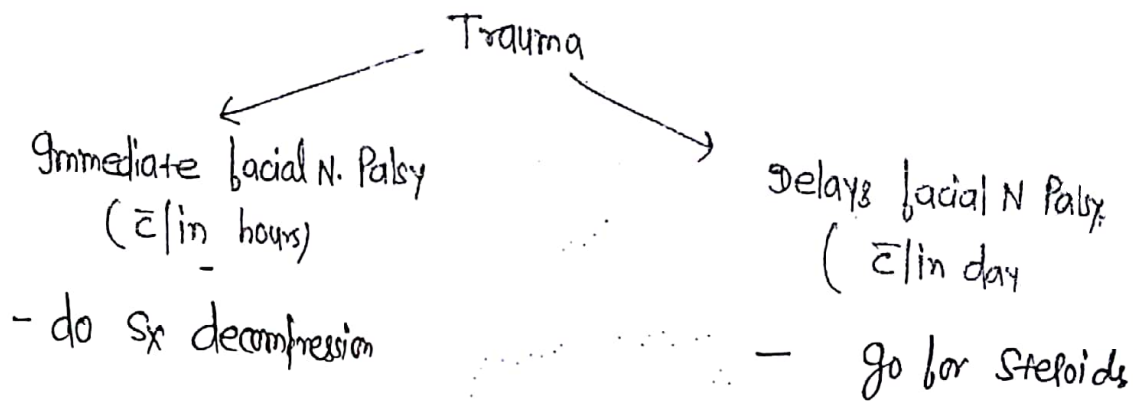
Facial Nerve Injury

(28)



Commonly Involved in Bell's Palsy.

* 7th CN. Makes a Loop around 6th CN.

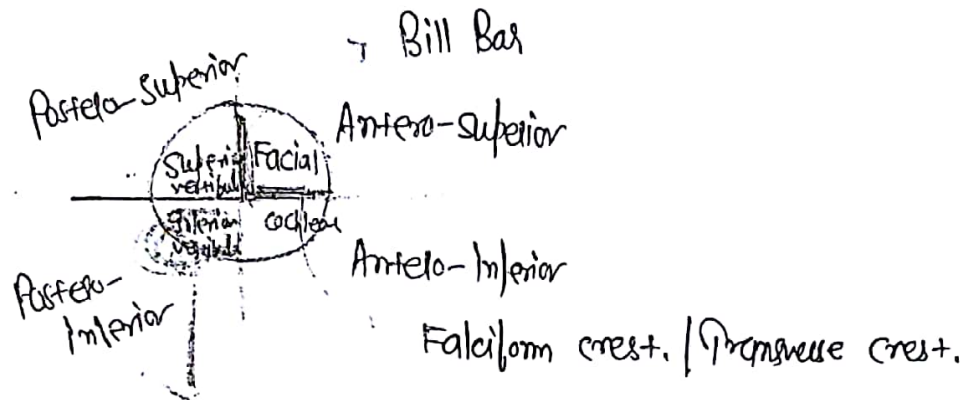
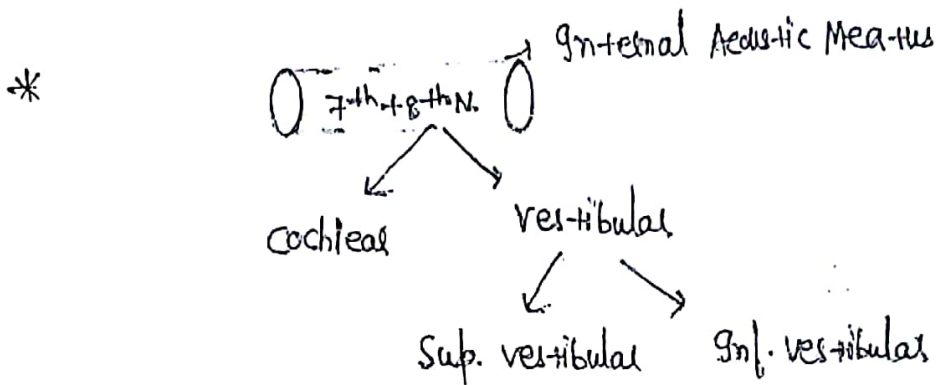


* Fallopian canal / Facial canal = covers Labyrinthine; Tympanic & Mastoid branch of Facial N.

* 1st Genu \Rightarrow at Processus cochleariformis

* 2nd Genu \Rightarrow at semi-circular canal.

* In Intracranial Facial Injury \Rightarrow Diplopia seen b/c 6th Nerve damage



Acoustic Neuroma

↳ Facial N. protected from it by Bill's Bar & Falciform crest

↳ Labyrinthine part is involved.
Bel's Palsy

1st preference \rightarrow Steroids In order of Preference

Should be prescribed within 3 days (Maxim benefit) \leftarrow Acyclovir (Herpes virus/EB virus)
B-complex

Physiotherapy (Least Preference Modality)

\leftarrow In 3 days we never prescribe physiotherapy b/c it leads to dyskinesia.

→ if patient is Not improved ; after 3 weeks

(39)



go for electrophysiological test



if there is evidence of Nerve degeneration



do sx decompression.

* REHABILITATION OF DEAF PATIENT

Conductive deafness ⇒ Hearing Aids

Sensory deafness ⇒ Cochlear Implants

Neural deafness ⇒ Brainstem Implants

Conductive deafness ⇒

Receiver
Amplifier
Microphone

⇒ Part of Hearing Aids
Pick ⇒ RAM

" Completely in the Canal (CIC) " Hearing Aids
↳ For cosmetically conscious P+.

" BTE (Behind the ear) " Hearing Aids
↳ For old Person

* "In the ear" (GTE)

* BAHIA (Bone Anchored Hearing Aid) → Indication

→ Canal Atresia

Canal Stenosis

Pus in the canal.

* Cochlear Implant

External device



Kept in Mastoid

- Made up of →

Processor

Microphone

Transmitter

Trick

↳ PMT

Internal device



Kept in Scala tympani
via Round window



Multi-channel electrode are the
best electrodes

- K/As "Receiver Stimulator"

- Stimulates the 8th Nerve.

- Post Lingual Candidates are the best candidate
for cochlear implant.

- M/c Indication ⇒ Mondini dysplasia
Contra Indicated in ⇒ Microtia Aplasia

Brain stem Implant

(30)

- In Neural deafness
- Structure wise similar to cochlear implant (only wire is long)
- Kept on Lateral Recess on IVth ventricle

* All congenital deafness are Sensori Neural except



Treacher collin sx

Crouzon sx



both are conductive deafness.

* As per National deafness programme : ⇒

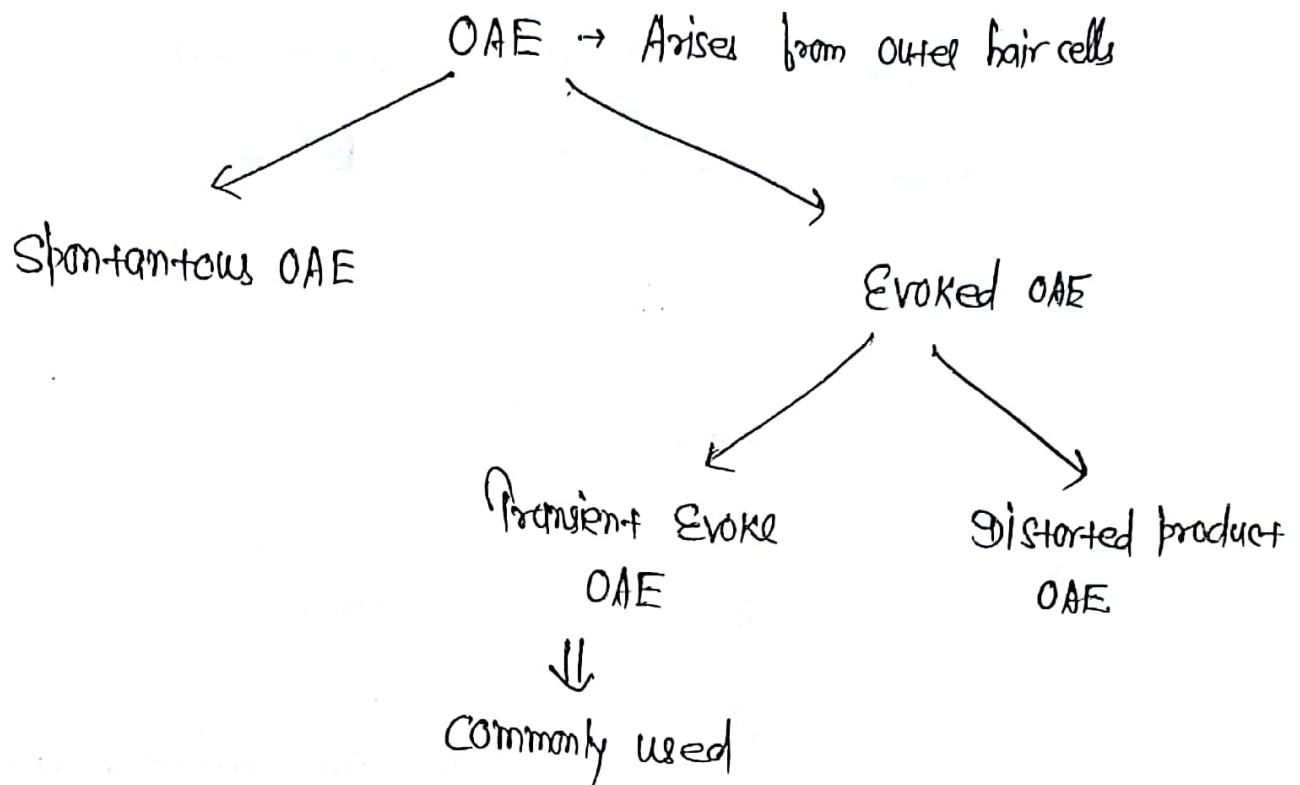
- OAE (Otoacoustic emission) should be done on 1st day,
- OAE should be definitely done by 1st month,
- Diagnosis should be confirmed by BERA by 3rd month,
- Fit should be done by 6th month; to avoid Any Maldevelopment in Language

* if Newborn is suffering from Intracranial Infection



BERA should be used for Screening procedure.

* OAE May be absent in (N) New born;



* Fistula test ⇒ Press the tragus & Look for vertigo;

Absent in (N) human

⊕ in Unsafe ear.

False ⊖ fistula test ⇒ No vertigo in the presence of fistula

eg ⇒ extensive cholesteoma;

Dead inner ear.

False ⊕ ve fistula test ⇒ vertigo in the absence of fistula

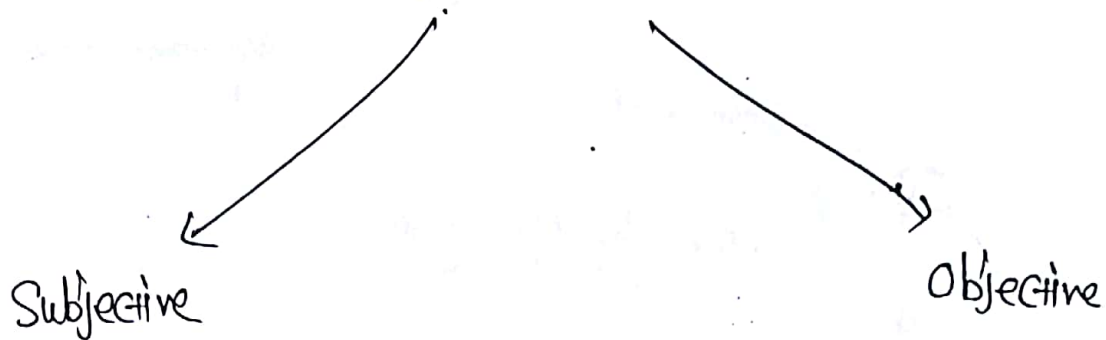
Hennebert sign ⊕

eg ⇒ congenital syphilis

Meniere's disease (—)

TINNITUS (Ringing sensation in the ear) (31)

- Any pathology of the ear can lead to tinnitus.

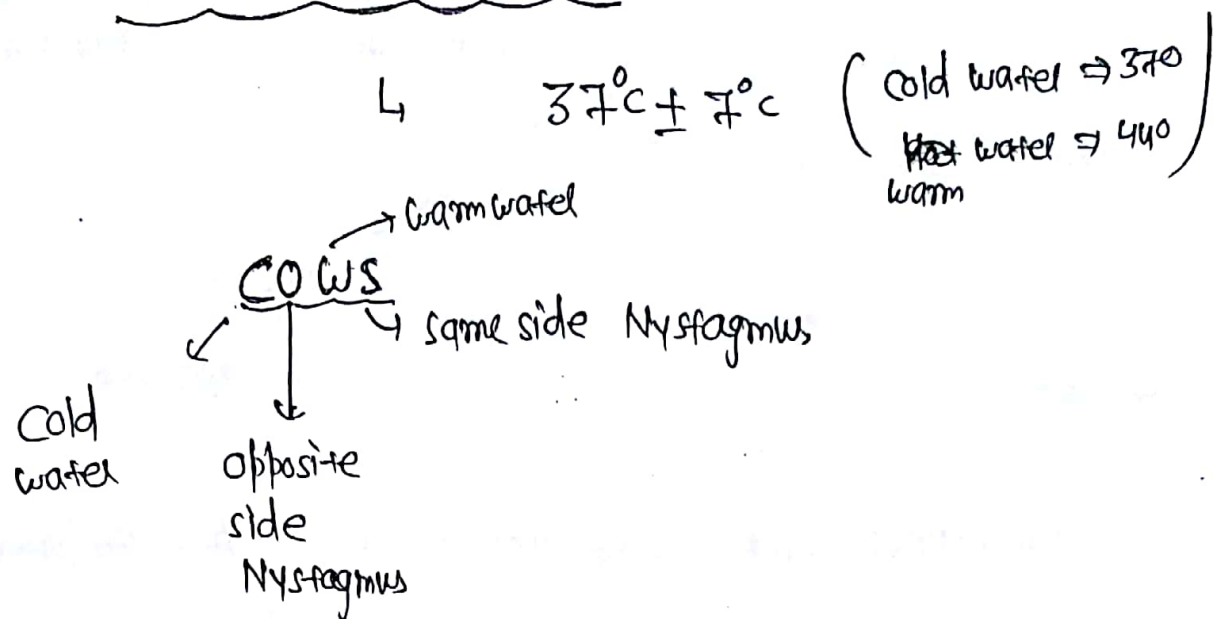


All causes are Subjective except \Rightarrow A-v Malformation;
Myoclonus ..

Caloric test

- Look for Nystagmus. after sensitization of vestibule
- Kobrak Caloric test \Rightarrow 37°C (Body temp.)
 - \hookrightarrow Stimulate Lateral canal.
- * Position of Patient \Rightarrow 60° back in sitting position
 - \hookrightarrow b/c in this position Lateral canal sensitized max (comes in vertical position)
- Modified Kobrak Caloric test \Rightarrow Used cold water; Rest same as Kobrak caloric test

Hallpike Bi-thermic caloric test \Rightarrow



— Patient position \Rightarrow Supine $\pm 30^{\circ}$ up.

Vestibular Evoke Myogenic potential

— Inferior vestibular Nerve Stimulated



See the Response of Sternocleidomastoid Muscle

* Benign Paroxysmal Positional vertigo

- Displaced otoconia from Macula \Rightarrow Aetiology
- M/c cause of Peripheral vertigo (for few seconds)
- Dix hallpike's test
- Rx \Rightarrow Epley's Manoeuvre

* How to calculate % of Hearing Loss \Rightarrow (32)

Given in question \Rightarrow

(Rt. side status)

(Lt. side status)

take the Average

\Downarrow

Subtract by 25

\Downarrow

Multiply by 1.5

\Downarrow

$$\left(\frac{[\text{Better ear} \times 5] + \text{Worse ear}}{6} \right)$$

Eg-7

60, 60, 90

$$\frac{210}{3} = 70$$

$$- 25 = 45$$

$$\times 1.5 = 67.5$$

30, 40, 50

$$\frac{120}{3} = 40$$

$$- 25 = 15$$

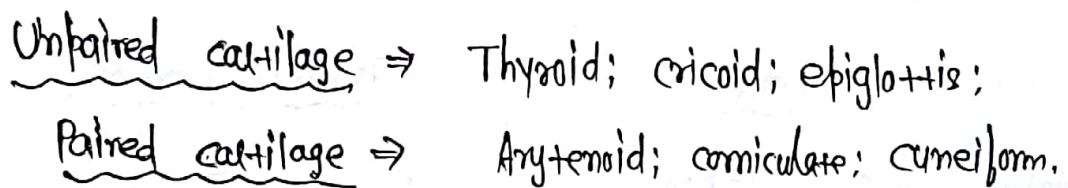
$$\times 1.5 = 22.5$$

$$\frac{22.5 \times 5 + 67.5}{6} = \frac{112.5 + 67.5}{6} = \frac{180}{6} = 30\%$$

* At 70% Deafness get Handicapped Certificate

- * if both ear are same; only Multiple by 1.5; No Need to go further two steps.
- * if Anyone ear is Normal then No need to give Disability Certificate

(33)



* All cartilage can ossify except \rightarrow epiglottis; cuneiform; cornicula

* All cartilage are hyaline except \rightarrow epiglottis; cuneiform; cornicula

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* All joints are synovial \Rightarrow Cricothyroid; cricoarytenoid
of Larynx. Two joints are possible

* Thyrohyoid Membrane pierced by superior Laryngeal Nerve

* 3 Neck Muscle sitting on Thyroid \Rightarrow Sterno thyroïd
Cartilage Inferior constrictor
Thyrohyoid

* Cricoid \Rightarrow Ring Like cartilage / signet shaped
cartilage / complete
cartilage

* Dimension of Larynx

<u>Sexes</u>	<u>Length</u>	<u>Transverse diameter</u>	<u>A-P diameter</u>
Male \rightarrow	44 mm	43 mm	36 mm
Female \rightarrow	36 mm	41 mm	26 mm.

* Development of Laryngeal cartilage

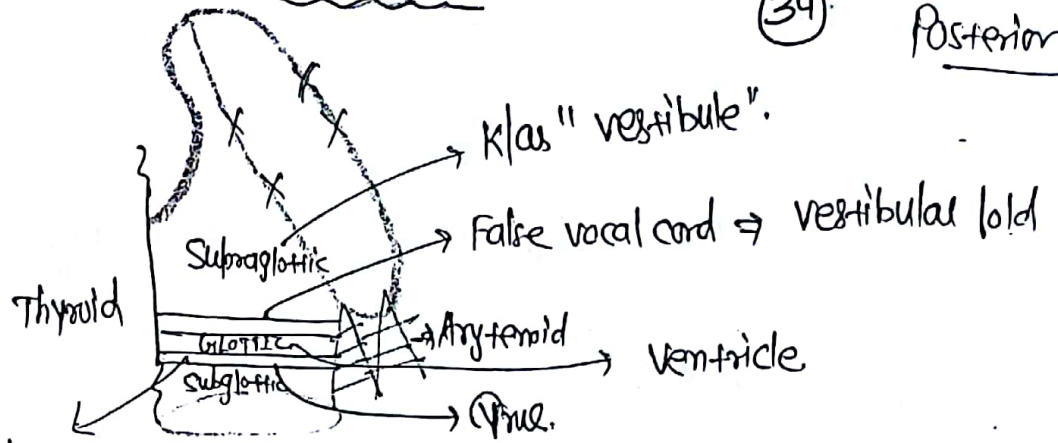
<u>Name of cartilage</u>	<u>developed from</u>
• Thyroid cartilage	\rightarrow Ventral ends of 4 th Arch cartilage
• Arytenoids	\rightarrow 6 th arch
• Corniculates	\rightarrow 6 th Arch
• Epiglottis	\rightarrow Hypobranchial eminence
• Cricoid & Tracheal Cartilages	\rightarrow 6 th branchial arch

Anterior

VOCAL CORDS

(34)

Posterior



True vocal cord
↓
Functional vocal cord



vocal cord
↓
are thickening
of Lateral wall

* Vocal cords Anteriorly attached
= thyroid & Posteriorly = Arytenoid

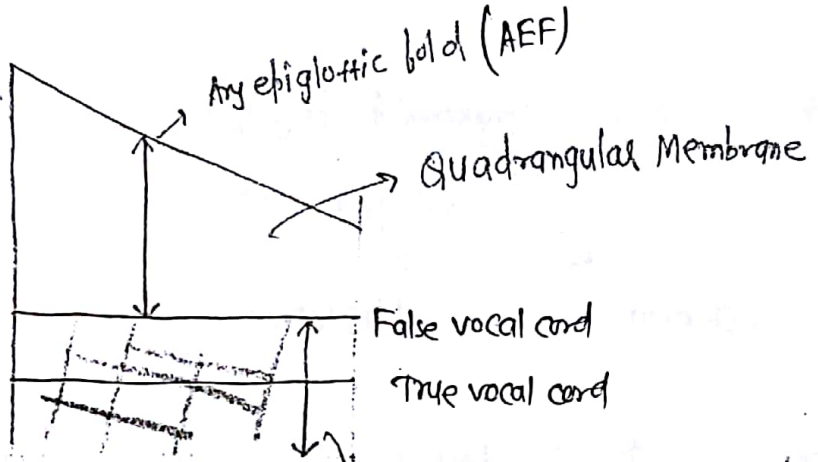
Right

* Lateral wall of Larynx

* ↓
Memb. from AEF to
cricoid.

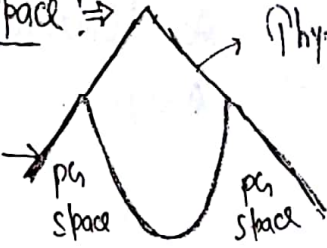
* Upper part of Membrane
(upto False vocal cord)

↓
Quadrangular Glottis +
Memb. Subglottis



* Paraglottic space ⇒
(Ph space)

Posterior
part of
Thyroid
cartilage

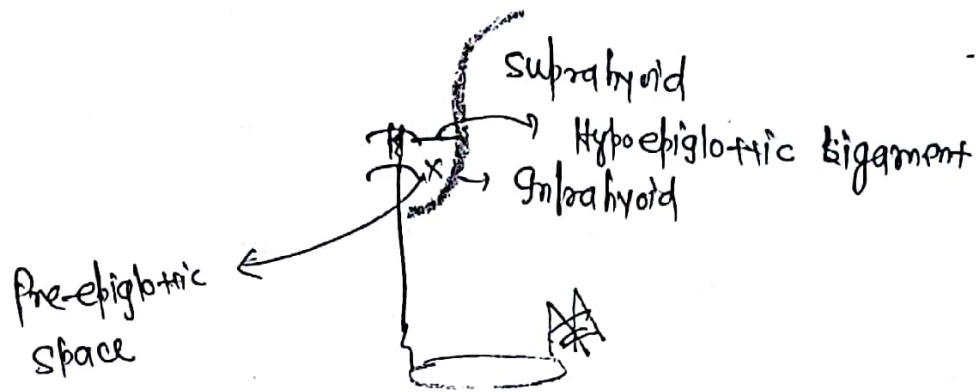


Thyroid cartilage (Anterior part).
elasticus.
Lower part of Membrane (from False
vocal cord to cricoid).

Medial boundry ⇒ Lateral wall of Larynx

Lateral boundry ⇒ Posterior part of Thyroid cartilage

* Pre-epiglottic space \Rightarrow

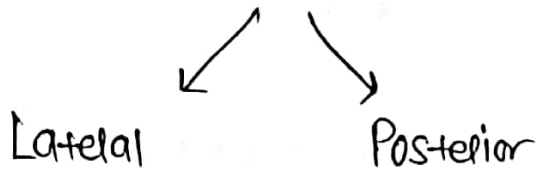


Anterior boundary \Rightarrow Thyroid; Thyrohyoid; Hyoid.

Posterior boundary \Rightarrow Superior part of epiglottis;

Superior boundary \Rightarrow Hyo-epiglottic Membrane

* Crico - arytenoid Muscle



* Any Pathology of Larynx three factors all always

present

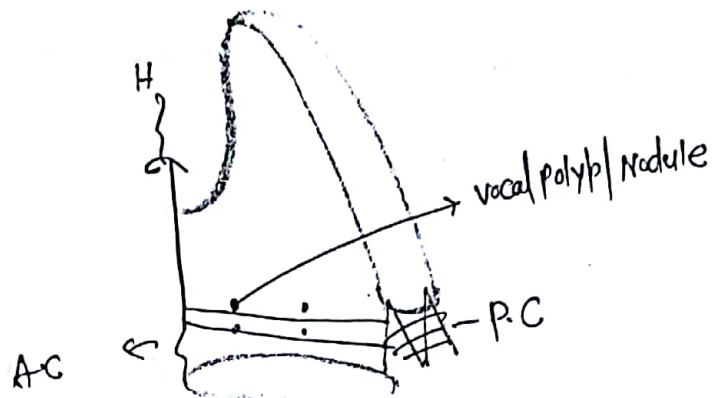
A \rightarrow Abuse \rightarrow Voice Rest

A \rightarrow Acid (Gastric) \rightarrow Antacid

A \rightarrow Allergy \rightarrow Anti-allergic

Commissure of Larynx

(35)



Posterior commissure is highly exposed; so; M/c commonly affected; except \Rightarrow

- ① syphilis
- ② Leprosy
- ③ Lupus
- ④ Congenital webs
- ⑤ Papillomatosis

these are at Ant. commissure

* Vocal polyp
vocal Nodule
Glottic carcinoma

M/c site \Rightarrow Junction of Ant. 1/3rd & Post. 2/3rd of Vocal cords

VOICE ABNORMALITY

i) Dysphonia plica ventricularis \Rightarrow Faulty use of False vocal cord
 \downarrow
Seen in "Mimicry"

\hookrightarrow give "speech therapy"
to patient.

ii) Megaphonia \Rightarrow Abnormal voice in front of public

\hookrightarrow Mx = Speech therapy

iii) Androphonia \Rightarrow Low pitched voice in female
 \hookrightarrow Male like voice

iv) Phonasthenia \Rightarrow weakness of voice d/t Muscle weakness

\downarrow
Both \leftarrow } Thyroarytenoid weakness
May weak... } Interarytenoid weakness

on Indirect
Laryngoscopy

Thyroarytenoid weakness \Rightarrow R  L - Elliptical appearance

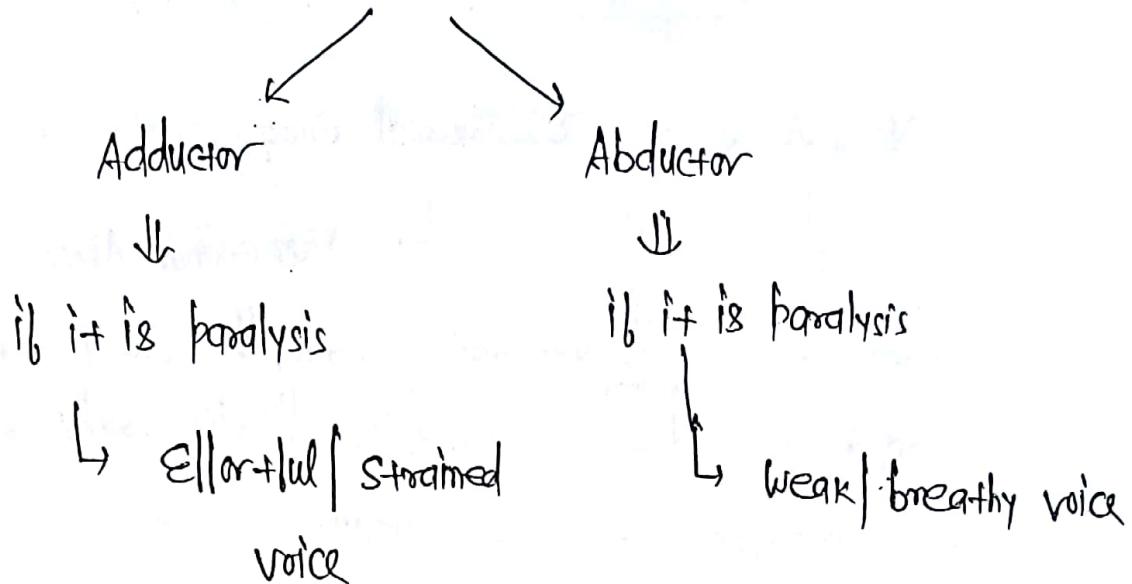
Interarytenoid weakness \Rightarrow R  L \rightarrow Triangular appearance

If both are weak \Rightarrow R  L \rightarrow Key hole appearance

$\Delta x \Rightarrow$ wait & watch (conservative Mx).

(36)

v) Spasmodic dysphonia \Rightarrow



Mx \Rightarrow Multiple injection of botulinum toxin

vi) Puberphonia \Rightarrow High pitched voice in Puberty

Pitch \Rightarrow old = child > Adult

• only seen in emotionally dependent boys.

• Non-organic (Functional) causes

Gatzman's test

Push thyroid inside
towards Azygoid
 \downarrow
Voice become Normal (b/c tension of
So; Puberphonia; vocal cord ves)
if voice Not (N) \Rightarrow organic cause

Mx \Rightarrow Psycho therapy.

vii) Functional Aphonia \Rightarrow Loss of speech d/t Psychogenic causes.

- seen in young females.
- all investigation (N) (i.e. Larynx \Rightarrow (N))

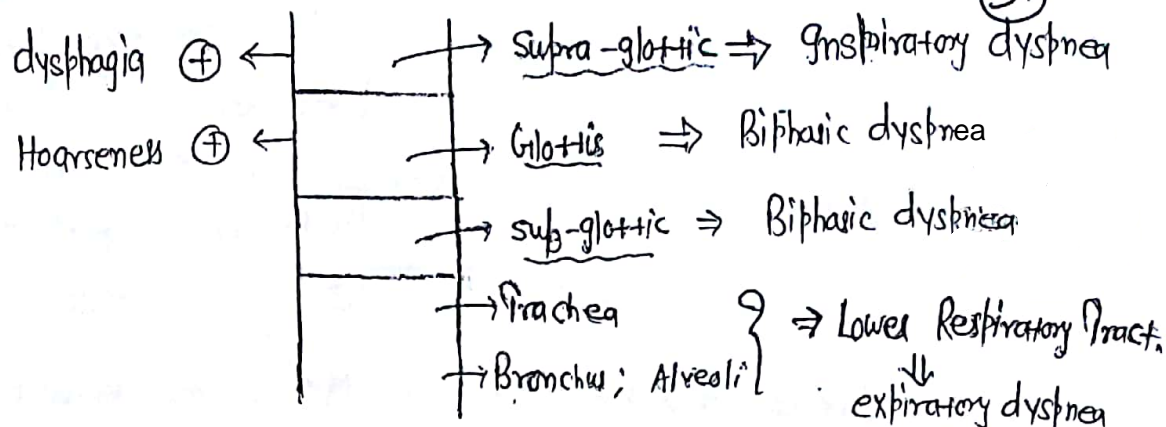
No voice = \bar{c} Normal cough

\hookrightarrow Functional Aphonia



Mx = Psychotherapy.

(31)



* Dyspnea is more pronounced during expiration; b/c of chest contraction

* Supraglottic = Inspiratory dyspnea = Dysphagia

* Biphasic dyspnea ± Hoarseness $\frac{d}{dt}$ Glottic segment.

* only biphasic dyspnea $\frac{d}{dt}$ Subglottic segment.

* expiratory dyspnea $\frac{d}{dt}$ Lower Respiratory tract.

Q9 Hot Potato voice ⇒ Subglottic Ca⁺⁺

Investigation of the Larynx

Indirect Laryngoscopy

- OPD procedure
- Sitting position
- Non-invasive procedure
- Supraglottic best seen
- Dominant hand
- No Anesthesia Required
- Warm-up for Antifogging, on mirror side

Direct Laryngoscopy

- OT procedure
- Supine position
- Invasive procedure
- Whole Larynx best seen
- Non-dominant hand
- Under General anesthesia

Indirect Laryngoscope

- only upper half is visible

Direct Laryngoscope

- also can give Local Anesthesia;
if we want to see vocal cord mobility.

OR

Biopsy from supraglottic part; if it has tumor or mass.

- Full Larynx is visible

* Paraglottic space & Pre-epiglottic space

↳ are Prognostic Marker (if tumor pr. @ here.)
Seen in MRI Larynx \downarrow Bad Prognosis

* Video-Stroboscopy \Rightarrow

- Flickering Light (Intermittent Light to see vocal cord mobility)
to visualize fine Movement of vocal cords / Glottic Movement.
 \rightarrow d/t slow Motion around wall of Larynx; we see clearly.

* Contrast Endoscopy \Rightarrow

Applying a chemical on Mass and appreciate the ^{color} change..



Iodine blue / Methylene blue

Carcinoma of Larynx

(38)

- * M/c type \Rightarrow SCC (Squamous cell carcinoma)
- * M/c site \Rightarrow Glottis > Supraglottis > Subglottis
- * M/c Predisposing factor \Rightarrow Smoking

* Glottic $\xrightarrow[\text{by}]{\text{IIT}}$ RT

Supraglottic $\xrightarrow[\text{by}]{\text{IIT}}$ Surgery.
Subglottic

- * order of Metastasis \Rightarrow Lungs > Liver > Thoracic vertebra

Protocol \Rightarrow i) Symptom;

ii) Duration of symptom (^{tells about} \checkmark Site of origin)

iii) I/L examination

iv) D/L examination (Biopsy)

v) MRI Larynx

vi) MRI Chest

vii) MRI Abdomen

viii) LN examⁿ

$\begin{cases} \rightarrow \text{No. of Lymph Node} \\ \rightarrow \text{Size of Lymph Node (M/imp parameter)} \\ \rightarrow \text{Level of Lymph Node} \end{cases}$
"Longest" is the ^{dimension} Main deciding factor.

Levels of Lymph Node in Neck →

$I_a = \text{Sub Mental}$

Ib = SubMandible

II = Upper Jugular

III = Middle Jugular

IV = Lower jugular

V = Post A of Neck

VI = Upper pre-tracheal } → Delphian Lymph Nodes

VIII 2. Lower pre-tracheal

drains the
Larynx

TNM classification \Rightarrow

$$N_1 \rightarrow < 3 \text{ cm}$$

$N_2 \rightarrow 3-6 \text{ cm}$

$$N_3 \rightarrow 76 \text{ cm}$$

$M_0 \rightarrow$ No Metastasis

$M_1 \rightarrow$ Measurand's

$M_X \rightarrow$ pt. Not investigation yet

Krause Lymph Node \Rightarrow Jugular foramen

Roy. view Lymph. Node \rightarrow Retropharyngeal space

Delphian Lymph Node \Rightarrow pre-tracheal space

Pharyngeal Larynx $\leftarrow \begin{cases} T_1 = \text{only one subunit (among supraglottic, subglottic, glottic)} \\ T_2 = \text{2 or 3 subunits involved} \end{cases}$

outside the Larynx ← T₃ = SP = Paraglottic; pre-epiglottic; Pharynx; Palatopharyngeal
cord; Perichondritis

Away from the Larynx $\left\{ \begin{array}{l} T_{4a} = 3^{\text{rd}} = \text{Tongue; Trachea, Thyroid muscle} \\ T_{4b} = \text{Mediastinum; pre-vertebral space; Carotid Artery.} \end{array} \right.$

* Fixed vocal cord is "Paralysis of vocal cord"

(39)

↳ k/a "Immobilized vocal cord".

* "Sluggish vocal cord movement / Impaired mobility / Partially Immobility"

↳ Comes under T₂.

↳ It means Not completely Paralyzed; Some Muscle fibres still good.

* If in question Carcinoma-in-situ given \Rightarrow CO₂ Laser.

In T₁ or T₂ \Rightarrow Radiotherapy
OR
Partial Laryngectomy

T₃ or T₄ \Rightarrow Total Laryngectomy
OR Radiotherapy.

If patient deny for surgery

↳ Concurrent chemo-Radiation

↓

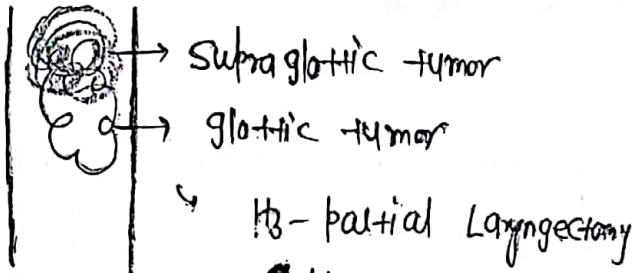
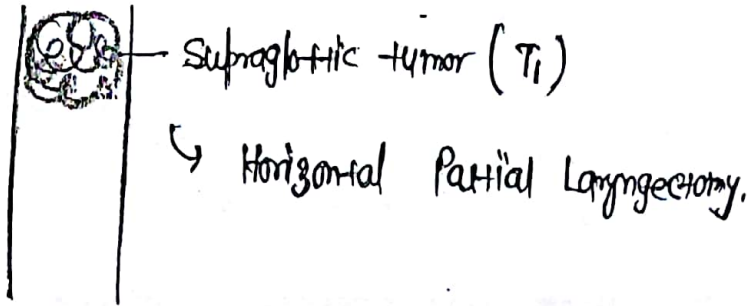
"Cis-platin" used /
"5-FU" used.

* Terminal stage \Rightarrow Go for Palliative Mx
↳ chemo-Radiation.

*

Types of Partial Laryngectomy \Rightarrow

①



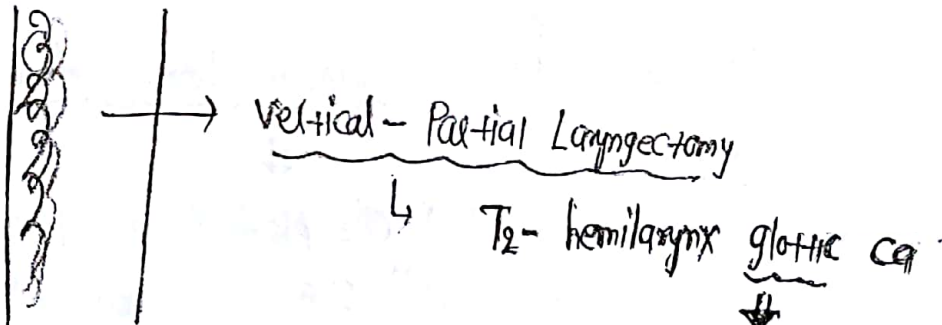
Indication

\hookrightarrow In case of T_1 Supra-glottic ca;

• early case of T_2 - Supra glottic ca;

Minim invasion of Pre-epiglottic space;

②



\downarrow

b/c tumor starts from here,
goes upwards & downwards; Not
touching the base of tongue; while
starts from supraglottic goes to
base of tongue also.

③ * Laryngotomy + cordectomy \Rightarrow Indicated for Radio-Resistant
 \downarrow Kias T₁ glottic Ca. (40)
Laryngolissure + cordectomy

* Pulmonary function test (PFT) is Mandatory before HPL.

\rightarrow to check the cough Reflex. \downarrow
both vocal and should be (N); Both lungs should be (N).

* In all cases of T₁ or T₂ \Rightarrow 1st Line of Rx

\downarrow
Radio-therapy ***

Q. O/E Mass \oplus in Rt. Aryepiglottic fold; Rt. false vocal cord
but both true vocal cord - (N); Rt. arytenoid - (N).

RxOC - ??

- (A) RT,
- (B) HPL
- (C) VPL
- (D) TL

TRACHEOSTOMY

Trachea contains 16-20 Rings

1st & 2nd Ring \Rightarrow High Risk of Necrosis.

\Downarrow

Best site for giving incision \rightarrow b/w 2nd & 3rd Ring

* "Vertical Incision" takes Min^m time; Leave Long Scar; give in emergency.

* "Horizontal Incision" takes More time Leave Min^m Scar

|| In the case of

Elective procedure

\swarrow Indication

Head & Neck tumors

* Any obstruction above trachea

\downarrow do Tracheostomy.

* M/c Physiological complication \rightarrow central Apnea (b/c of CO₂ without)

* M/c complication \Rightarrow Hemorrhage (veins > Artery)
 \downarrow Thyroid vessels bleed.

* Most dangerous complication \Rightarrow Surgical emphysema leading to Pneumothorax.

* Advantage of Cuff tube \Rightarrow Keep tube in position!
Reduce the chances of Aspiration

* Disadvantage of cuff tube \Rightarrow Pressure Necrosis of Trachea (High volume; Low pressure).

* Uncuffed tube \Rightarrow Used where No chance of aspiration \oplus ^{***}

(41)

* Fenestrated tube \rightarrow A valve like opening in the Tracheostomy tube.

\rightarrow Pti. will speak out \bar{c} the help of this tube

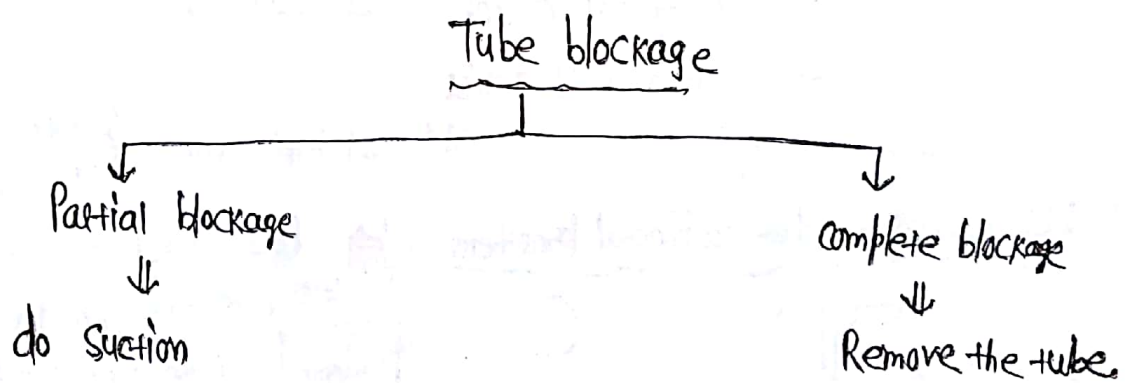


res air flow to Larynx / vocalization of voice.

* Low-level tracheostomy \Rightarrow Indicated for infection having high Risk of dissemination, eg \rightarrow Diphtheria

* High-Level tracheostomy \Rightarrow done for Malignancy; to preserve the actual site for permanent Tracheostomy.

* Site of Permanent tracheostomy can be decided only after Total Laryngectomy.



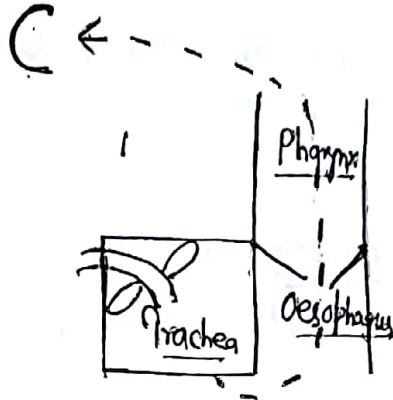
* Every 2 hours for 5 minutes; deflates the cuff tube



Never change the tube by attendant in 1st 7-10 days; b/c Proper tract is Not there.

- * BJORK FLAP \Rightarrow Inferior base Flap below tube :
 \hookrightarrow It has the chances of dislodgement *

REHABILITATION OF PATIENT AFTER TOTAL LARYNGECTOMY \Rightarrow



- Esophageal speech \Rightarrow esophageal Air in form of voice
 - \hookrightarrow Big failure
 - \hookrightarrow Success Rate = 50%
 - \hookrightarrow 6-8 words we can speak out
- Pt. taught to Swallow Air & hold it in the upper esophagus & slowly eject it from the esophagus into the pharynx.
- Electrolarynx \Rightarrow Neck vibration in form of speech.
 - external device
 - Hand-held device

- Blom-Singer tracheo-esophageal prosthesis \Rightarrow b/w trachea & esophagus we place the prosthesis;
 - Post. wall of trachea
 - Ant. wall of esophagus



Whenever air passes through this prosthesis sound is produced.

- Best Method till date
- Never aspirate b/c there is Microvalve inside it.

Epiglottitis

- Emergency condⁿ
- Acute condⁿ
- high grade fever
- Inspiratory dysnea
- Dysphagia
- No Hoarseness

- Thumb sign

↳ on Lateral view
of X-Ray

- H. influenza (if No H1N1 vaccination tick it)
- Streptococcus (≡)

- Rx ⇒ iv Antibiotic ^{kkk}

⇒ Never give any painful
stimulus to the patient

^{kkk} ⇒ Never treat the patient

@ Primarily; gavis
Mandatory.

Laryngo-tracheo-bronchitis (Croup)

(42)

- Not an emergency
- Chronic condⁿ
- Low grade fever
- Biphaseic | expiratory dysnea
- No dysphagia
- Hoarseness May be ⊕

- Steeple sign (V)

↳ on X-Ray (AP view)

Subglottic narrowing → seen only in steel sign
Church-top sign (on lower part)
Pencil-thin sign (on upper part)
Parainfluenza virus
type- 1, 2, 3

Rx ⇒ Symptomatic Rx

- Bronchodilators
- Analgesics
- Nebulization

Condⁿ (Abnormality) ⇒

Site

Trauma ⇒

Subglottis

Sarcoidosis ⇒

Subglottis

Amyloidosis ⇒

Subglottic

Wegner granulomatosis ⇒

Subglottic

Chondroma of the Larynx ⇒

cricoid cartilage

Perichondritis ⇒

cricoid cartilage

• Hemangioma of the Larynx ⇒ M/c vascular tumor of Larynx.

↳ M/c site ⇒ Left Posterior Sub-glottic Area.

Rx ⇒

Steroids / CO₂ Laser / Sx / Interferon.

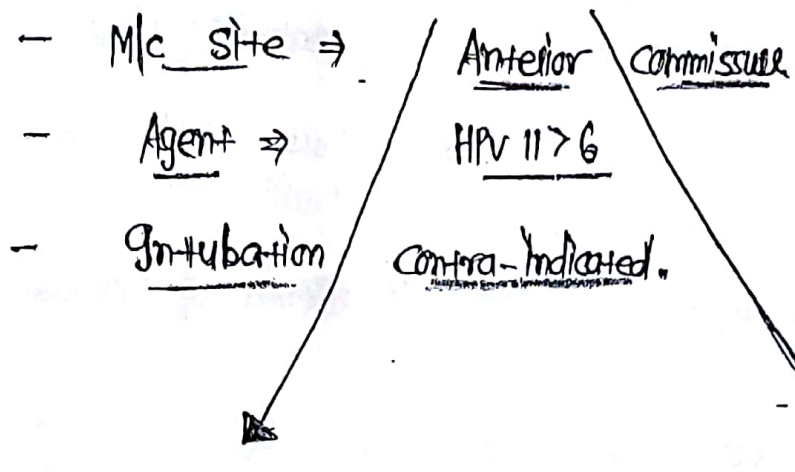
Radiotherapy ⇒ Not given

↳ also avoid in "Malignant Melanoma"
↳ b/c It Reduces the immune status of the body.

• Radiotherapy always preferred in — Glottic Ca

↳ Nasopharyngeal Ca

Papillomatosis



Juvenile

- Multiple
- Resolve spontaneously
- Reoccur spontaneously
- Vocal Ligament Absent (so; thin vocal cord)

Senile

- Single
- Never Resolve
- Never Reoccur
- Thick vocal cord

Rx \Rightarrow

CO₂ Laser

"Cidofovir drugs used"

AI-209
*

Most children \bar{c} Recurrent Laryngeal Papillomatosis are born to Mothers \bar{c} condylomata acuminatum during \bar{c} & Parturition.

TB (Tuberculosis)

- M/c E.N.T. Manifestation of T.B \Rightarrow cervical Lymphadenopathy
- M/c site in Nose \Rightarrow Anterior end of Inferior turbinate
- Multiple perforation \Rightarrow T.B. Ear
 - \Downarrow
 - always painless
 - May colourless / blood stain
 - May odourless / Foul smell

- M/c site of TB Larynx \Rightarrow Posterior commissure
- M/c symptom \Rightarrow Painful and weakness of voice
- M/c sign \Rightarrow Loss of Adduction

Earliest sign \Rightarrow Hyperemia of Posterior commissure

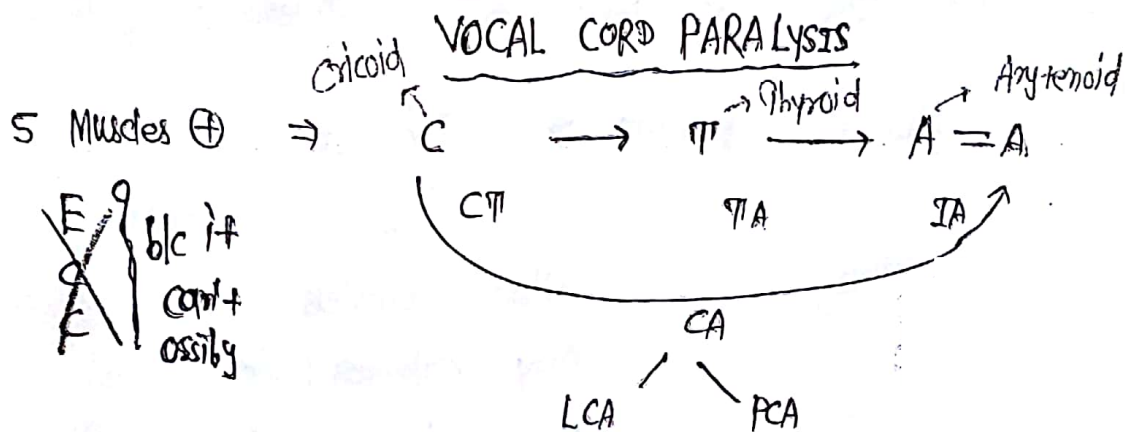


"Mouse-bitten appearance" of Vocal cord

- Pseudoedema of the epiglottis present
 - \hookrightarrow b/c of cellular infiltration,
- "TURBAN Epiglottis"

• Mx \Rightarrow ATP ⁺⁺

* TB-Larynx \Rightarrow affects Posterior 1/3rd of Larynx More commonly than Anterior part.



44

→ Superior L.N.

- external L.N.

Internal L.N.

except \Rightarrow Cricothyroid \Rightarrow external br. of superior L.N.

* All are Adductor Muscle except \Rightarrow PCA \hookrightarrow Abductor Muscle

* Recament L.Nr. Supplies 3 Adductor & 1 Abductor.

* Superior L.N: supplies only adductor (C_T)

Strongest Adductor:

* Sensory supply

Area below the vocal cord \Rightarrow Recurrent L.N.

Area above the vocal cord \Rightarrow Internal br. of superior L.N.

* Recurrent L.N. \Rightarrow Mixed N.

Internal br of Superior L.N. \Rightarrow Sensory N.

External bind Superior LN \Rightarrow Motor N.

* In Any organic Pathology;

* Posterior crico Arytenoid \Rightarrow 1st to be paralysed & Last to be Recovered;

While all adductors are Lost to be paralysed & 1st to be Recovered.

SEMON'S HYPOTHESIS

Adductor Muscle



Embryologically old

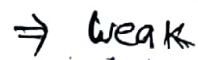


Strong

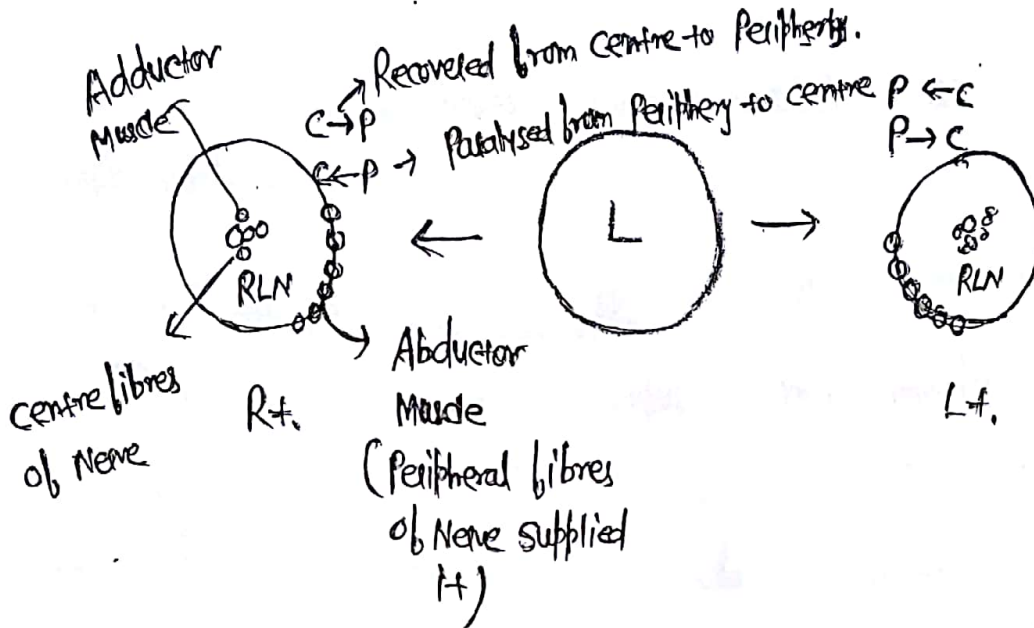
Abductor Muscle



Embryologically New



Weak



SEMON'S Three stage



1st stage ⇒ Paralysis of Abductor

2nd stage ⇒ Contracture of Adductor

3rd stage ⇒ Paralysis of Adductor

Distance from Midline	Position of vocal cord	Healthy Cond ⁿ	Disease
0 mm	Median	Phonation	RLN Paralysis
1 mm	Paramedian	Whispering	RLN Paralysis
3 mm	Intermediate	XXX	Both Paralysis
7 mm	Gentle Abduction	Quiet Respiration	SLN Paralysis
9 mm	Full Abduction	Deep Respiration	SLN Paralysis
→ also k/as "cadaveric Position".			

- * In case of Recurrent Laryngeal N. Palsy vocal cord assumes Median & Paramedian Position; b/c of (N) crico-thyroid Muscle (45)



K/au "Wegner Grossman Law"

- * M/c Injured Nerve \Rightarrow Recurrent Laryngeal Nerve **
 \downarrow
 Superior Laryngeal Nerve
 \rightarrow Left > Right (b/c of Long course)

but; in thyroid sx \Rightarrow * SLN > RLN (Injury)*

- * M/c cause of Unilateral vocal cord palsy \Rightarrow Malignancy **

M/c cause of Bil vocal cord palsy \Rightarrow Thyroid sx **

- * if only Vocal cord Palsy \Rightarrow Malignancy > Surgery > Idiopathic
 Mention in question

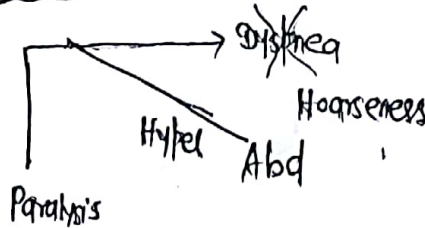
- * EG Incomplete Paralysis $\xrightarrow{\text{K/au}}$ Partial Paralysis $\xrightarrow{\text{K/au}}$ RLN Paralysis
Complete Paralysis $\xrightarrow{\text{K/au}}$ Total Paralysis $\xrightarrow{\text{K/au}}$ RLN + SLN Paralysis

- * if patient have dysnea ; Aspiration \Rightarrow Surgical Intervention
 Hoarseness \Rightarrow wait & watch (w/w)

Nerve Palsy

U/L RLN Palsy ⇒

Position of vocal cord



Symptom

Wt

Compensated
hoarseness

Wt

B/L RLN Palsy ⇒



dyspnea

Tracheostomy

U/L SLN Palsy ⇒

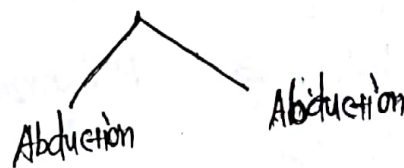
Paralysis
(Hoarseness)

Wt

↓
aspiration Not
comes in picture ;
b/c epiglottis has
Both sided supply
of SLN

Abduction

B/L SLN Palsy ⇒



Aphonia
+++
Aspiration

Epiglottoplasty
+
Tracheostomy

Thyroplasty ⇒

Repair of the thyroid to Manipulate

↳ Gsshiki classification

Type - I

⇒

Medialisation

→

In SLNP

Type - II

⇒

Lateralisation

→

In RLNP

Type - III

⇒

Shortening (Relaxing)

→

In Relaxed cases of laryngeal

Type - IV

⇒

Lengthening (Tensioning)

→

In Aphonia cases

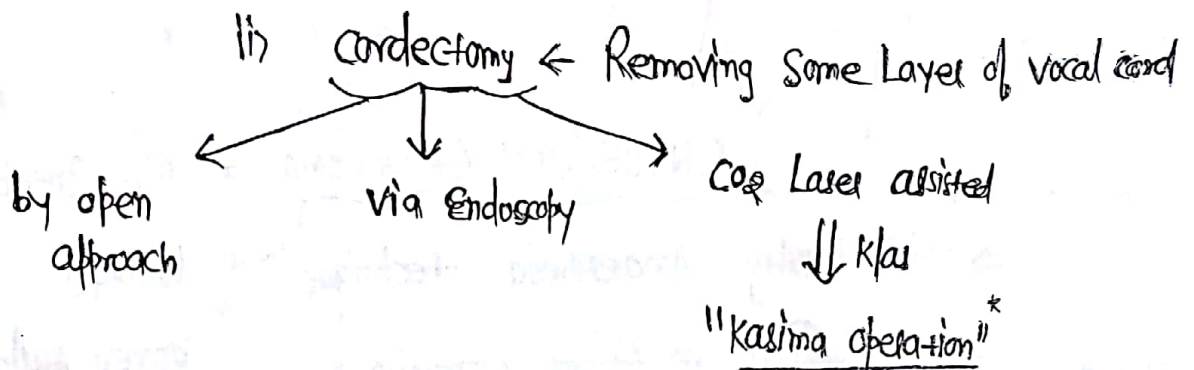
* Method of Medialization

(46)

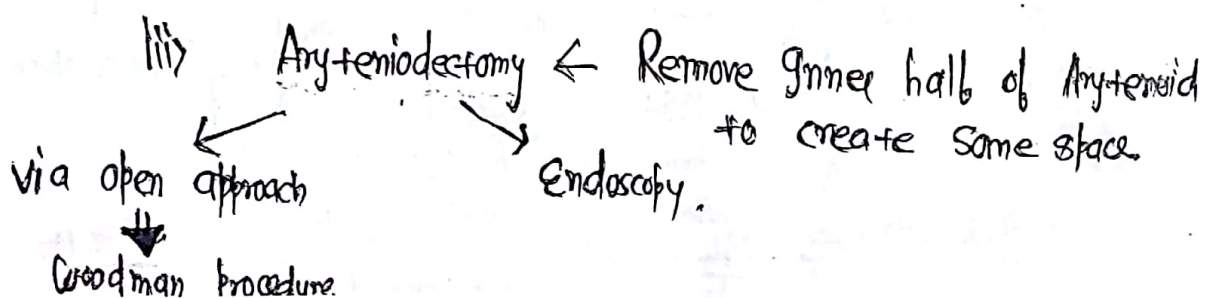
- ↳ Tilt for SLNP
- ↳ by Type-I thyroplasty
 - Injection of Teflon
 - Injection of Gelfoam.

* Method of Lateralization

- ↳ Tilt for RLNP
- ↳ by type-II thyroplasty.



- type-I ⇒ Sub epithelial
- type-II ⇒ Sub-Ligamentary
- type-III ⇒ Trans-Muscular
- type-IV ⇒ Total Cordectomy
- type-V ⇒ Extended cordectomy.



* Safety Nerve \Rightarrow Internal br of superior L.N.

Safety Muscle \Rightarrow PCA
 \hookrightarrow help in Respiration.

CONTACT ULCER \Rightarrow dip
In excessive vocal abuse \rightarrow concave surface

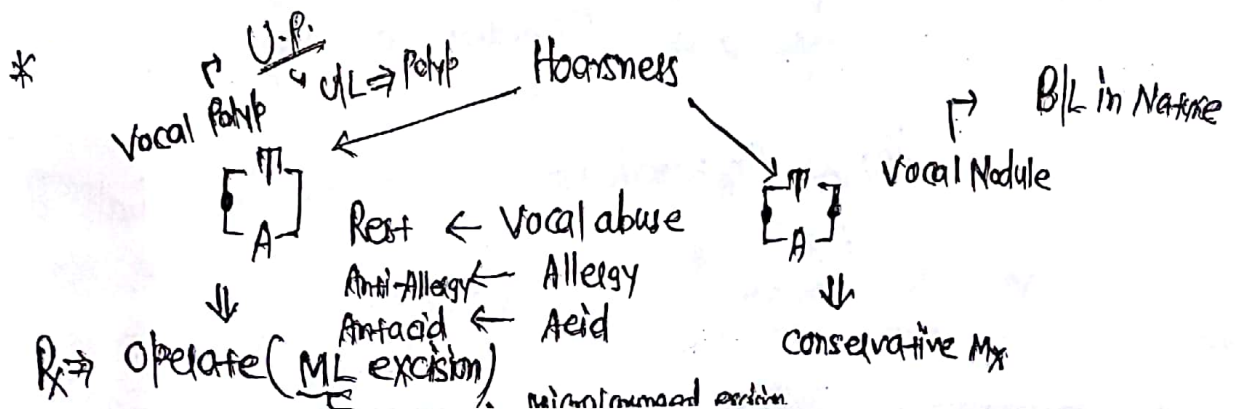
(a) Posterior commissure

\Rightarrow Rx \Rightarrow Voice Rest
Ant-acid
Anti-allergic

INTUBATION GRANULOMA \Rightarrow H/O Intubation present.

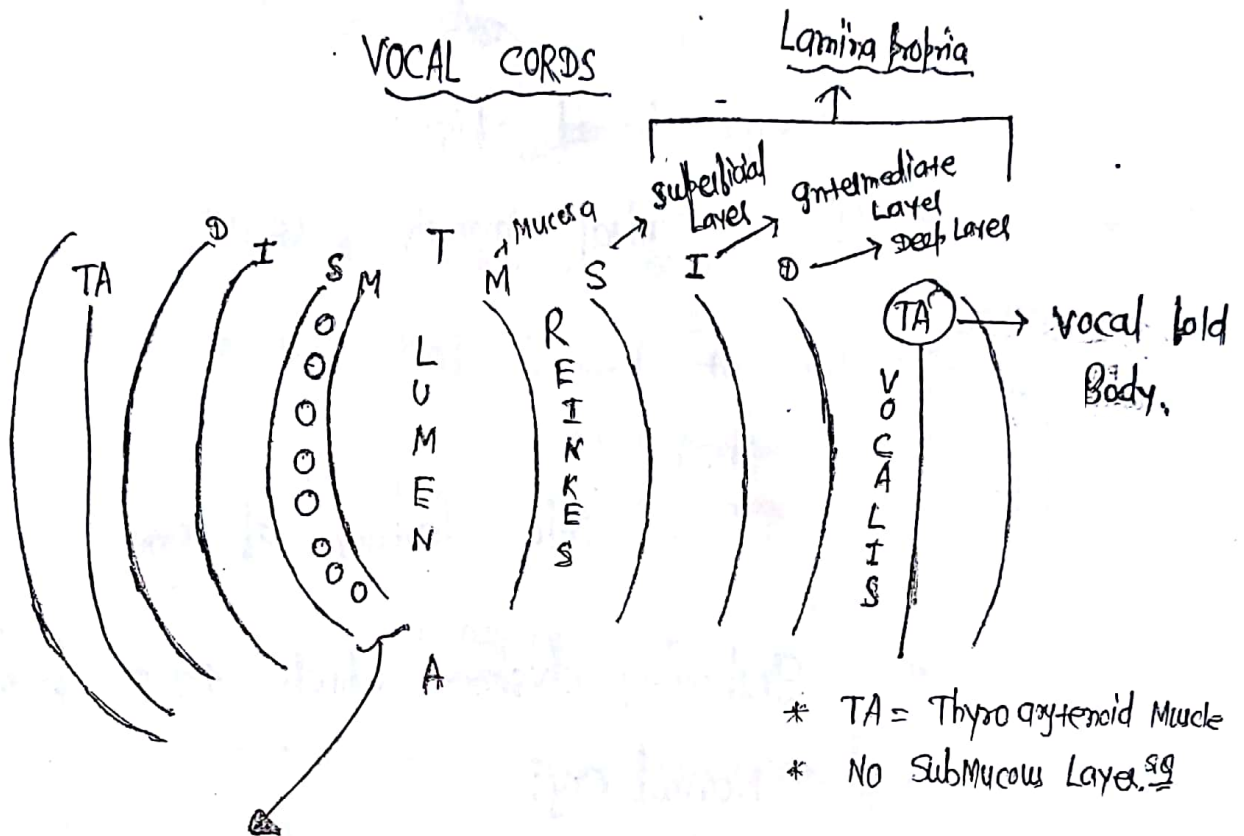
\Rightarrow Faulty Anaesthesia technique \rightarrow buldge
(a) Posterior commissure convex surface

\Rightarrow Rx \Rightarrow Voice Rest
Ant-acid
Anti-allergic



* Vocal Nodule \Rightarrow Benign Neoplastic growth on free edge of both the vocal cords @ the junction of Anterior 1/3rd & Posterior 2/3rd. (47)

\hookrightarrow Major cause \Rightarrow Vocal Abuse (AI-13)



* TA = Thyroarytenoid Muscle
* No Submucosa Layer.

Combine to form \Rightarrow Vocal Ligament
 \Downarrow
 \ominus in Newborn

Reinke's edema

\Downarrow
Polypoid degeneration

\hookrightarrow 1st Line of Rx \Rightarrow Voice Rest

\downarrow if Not Respond

Microsurgical Stripping

*k & Indication

Anti-acid
Anti-allergic

① Reinke's edema
② Ca In situ.

Congenital Abnormality of Larynx

• LARYNGOMALACIA

* Soft | weak | Floppy Subglottis \Rightarrow on A-P view



Omega-shaped epiglottis

- M/c Congenital Anomaly of Larynx.

- M/c Pathology of Larynx.

- \Rightarrow Inspiratory dyspnea which res on feeding;
- \Rightarrow Normal cry;
- \Rightarrow Short Relax Aryepiglottic fold.
- \Rightarrow New born comfortable in Prone position.
- \Rightarrow Max'm cases are asymptomatic

\hookrightarrow so wait & watch

\Downarrow Got improve

\bar{c}/in 2 weeks

\Downarrow all improve

in 2 years

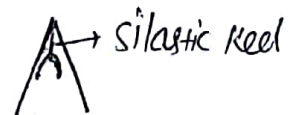
(so, Never make diagnosis beyond 2 years)

if severe dysnea ⊕ ⇒

48

*

Congenital webs



M/c site ⇒ Ant. commissure **

* Biphasic dysnea ⊕ ABN cry.

Rx ⇒ CO₂ Laser

* "COHN'S" classification is used.

- Silastic keel is used to avoid Adhesion.

Excision via Laryngofissure b/b Placement of silicon keel (McNaughten keel) & Subsequent dilation
↳

*

Congenital stenosis

M/c site ⇒ Sub-glottic Area

* Biphasic dysnea ⊕ ABN cry.

* Maxm pts are asymptomatic

↳ Wait & Watch

* if acute dysnea ⊕ ⇒ we dilators (Metallic)

* if chronic dysnea ⊕ ⇒ Excision Recombinosis

McCallum classification

<3mm - In pre-term baby

<4mm - Full term baby.

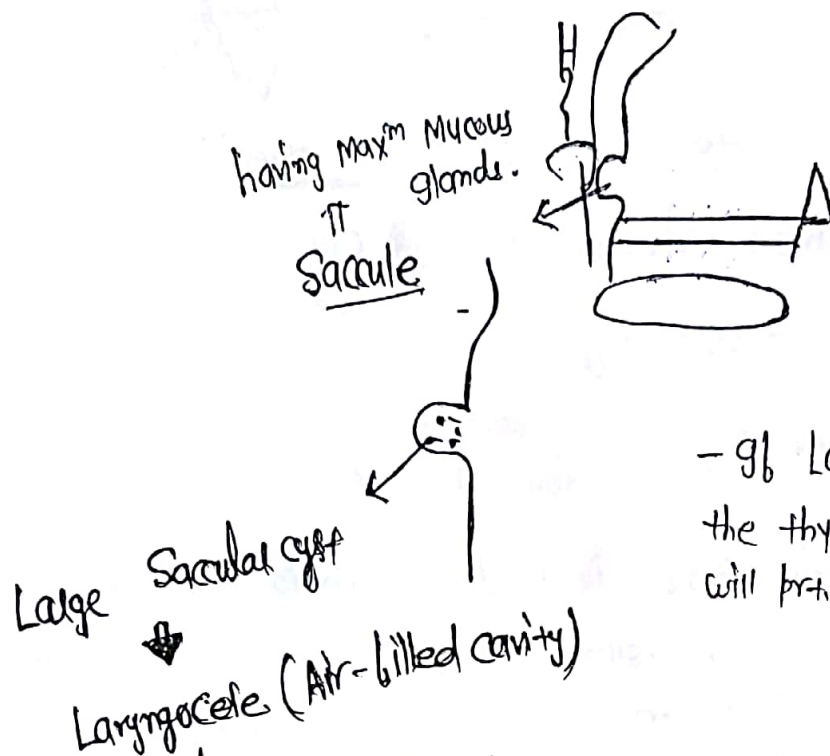
Cotton Mayer classification

Grade-I ⇒ <50% obstruction

Grade-II ⇒ 51-70% obstruction

Grade-III ⇒ 71-99% obstruction

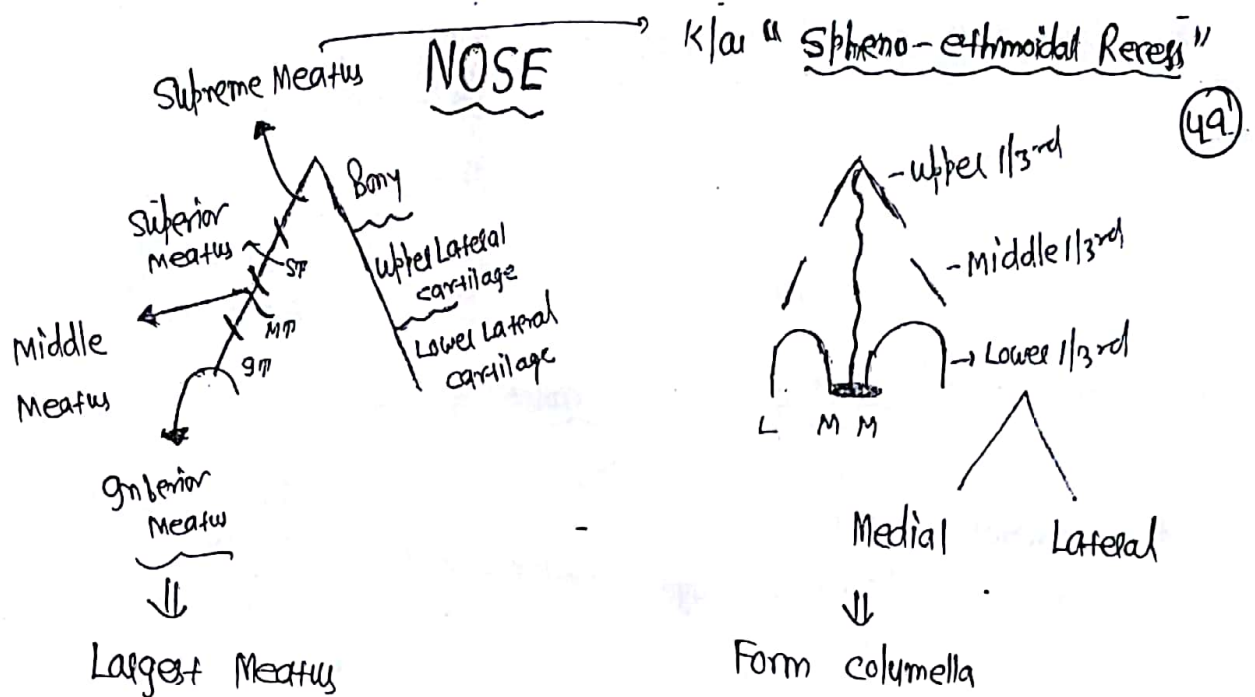
* oil tank of Larynx \Rightarrow Sacule; which helps in Lubrication.



- If Laryngocoele progress & Rupture the thyrohyoid Membrane; it will protrude "

\hookrightarrow Thyrohyoid Membrane Rupture is clue for Laryngocoele

* PPP Rule (Posterior commissure Points to paralyzed side in U/L Superior Laryngeal Nerve falsey).



* EIT opens 1.25 cm behind the inferior turbinate.

* All turbinates are part of ethmoidal bone !+ except

* Total 3 turbinates +nt

↳ Superior; Middle; Inferior.

↓
Inferior turbinate
(separate bone)

↳ It articulates c
ethmoid

* pH of Nasal cavity = 7 (Normal)

* Amount of water secreted from cavity = 1 Litre / day.

* Inferior turbinate ossification = 5th Month of GUL.

* Alternate congestion, decongestion in Nose (one side congestion then other side Decongestion),

↓
1 Nasal cycle

↳ duration \Rightarrow 2.5-4 hours

* Olfactory area \Rightarrow Upper 1/3rd (2-5 cm²)

Respiratory area \Rightarrow Lower 2/3rd

* Anterior - Posterior Length of the Nose \Rightarrow 8 cm
(Nip) (Chogmq)

* Upper 1/3rd bony part consist of \Rightarrow a) Two Nasal bone;

b) Frontal process of Maxilla

c) Nasal process of Frontal bone
 \hookrightarrow Lateral to Nasal bones on each side;

d) Nasion \Rightarrow junction of Nasal bone & Nasal process of Frontal bone

* Lower 2/3rd cartilaginous part consist of \Rightarrow

2 Upper Lateral cartilage

2 Lower Lateral cartilage

2 or More Alar (serrimoid) cartilage

1 Septal cartilage

\hookrightarrow Quadrangular / Quadrilateral space. NEETIC

* Nose \Rightarrow Midline structure

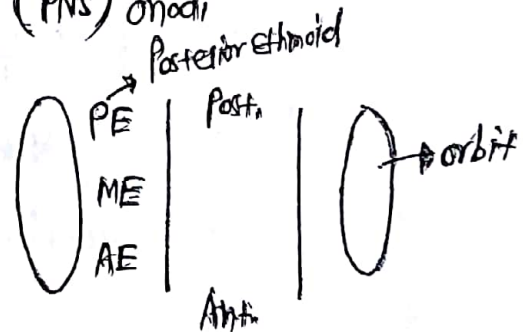
\hookrightarrow Any cavity surrounding Nose

\hookrightarrow Paranasal sinus

Paranasal Sinus (PNS) onodi



Supero-Inferior section



Antero-Posterior section

• Sphenoid sinus is Postero-Superior to the Nasal cavity

• Largest PNS = Maxillary sinus = 15ml.

Most functional sinus = Ethmoidal sinus (Max^m air cells)

\Downarrow
 15 air cells (5A, 5M, 5P)

• Length of Pharynx \rightarrow 15cm

* Foramen of Brieschet \Rightarrow Venous drainage of Mucosa (So)
 \Downarrow
 site of potential Intracranial spread
of Infection.

* V.V.G	<u>Status @ birth</u>	<u>Adult size</u>	<u>1st Radiological evidence</u>
<u>Maxillary sinus</u> \rightarrow	present	15 yrs	4-5 Months.
<u>Ethmoidal sinus</u> \rightarrow	present	12 yrs	1 yr.
<u>Frontal sinus</u> \rightarrow	Not present	Until teens	6 yr.
<u>Sphenoid sinus</u> \rightarrow	Not present	15 - Adult	4 yr.

* Water's view \Rightarrow Best view to see Maxillary sinus.
 * Caldwell's view \Rightarrow For ethmoid & frontal sinus.
 * Lateral view \Rightarrow For sphenoid sinus
 \hookrightarrow 2nd best \Rightarrow Water's view \bar{c} open Mouth.

Q. on water's view all sinuses seen except??
 a) Maxillary; b) Frontal; c) Sphenoidal; ~~d) Posterior ethmoid.~~

* Frontal sinus \Rightarrow Shows Max variation in development.
 \hookrightarrow development of Frontal sinus \Rightarrow Physiological upto 4 yrs.
chilling of saliva in Newborn \Rightarrow Physiological upto 4 yrs

ANATOMY

* Most prominent part of Forehead \Rightarrow Glabella

Upper edge of Nasal bone \Rightarrow RADIX / Root of Nose

Angle b/w Glabella & Radix / Nasofrontal Angle \Rightarrow Nasion (115-135°)

Bony cartilagenous junction \Rightarrow Rhinion

Nasolabial angle \Rightarrow 105°

* Most prominent point on the Nasal tip \Rightarrow Prionasale

• Anterior Air cells = Agger Nasi
 ↳ of Anterior Ethmoid, elevation Anterior to Middle turbinate

• Bulla Ethmoidalis ⇒ pr. in Anterior Ethmoidal sinus
 ↓
 Largest Air cells

• Floor of orbit combine w/ floor of Anterior ethmoid
 ↓
 Roof of Maxillary. formed by Haller cells

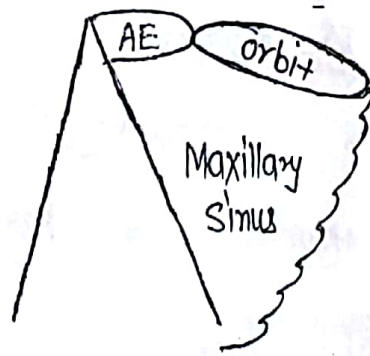
• 'Pneumatization' of the orbital floor
 ↳ False Impression of Haller cells.

• Most posterior cells ⇒ Onodi cells
 ↓
 Part of Posterior ethmoid; close to optic Nerve

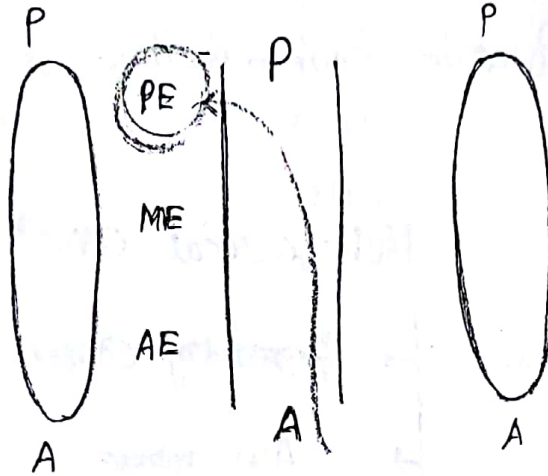
for Any topic * of Nose ⇒ Ixoc = Rxoc = Endoscopy
 ↓
 diagnostic Endoscopy FESS

* CONCHA BULLOSA ⇒ Largest turbinate
 ↳ Pathological structure.

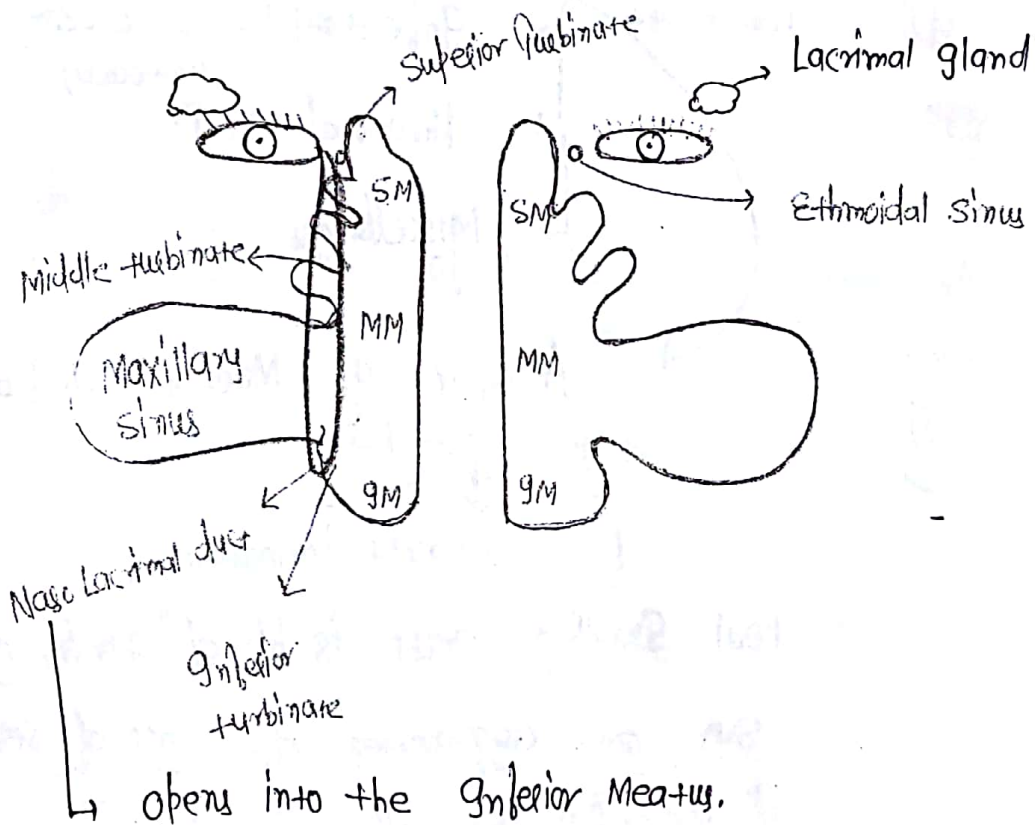
B/c of Any trauma; if Some air get trapped in turbinate, size increases like "concha bullosa", also known as "Pneumatization of turbinate"



(Si)
 Floor of orbit combines floor
 of Anterior ethmoid
 ↓
 Roof of Maxillary Sinus



concha bullosa
 ↓
 B/c of Any trauma



- Mostly in ♀ during puberty.
- ## RHINITIS (watery discharge)
1. Hypertrophic Rhinitis ⇒
 - Commonly Involved ⇒ Inferior turbinate
 - "Mulberry like Nasal Mucosa" ⇒ Hallmark feature
 - RxOC ⇒ KTP Laser
 - ↓
 - Potassium titanium phosphate

2. Atrophic Rhinitis ⇒ Multibacterial condⁿ
 - (OZAENA)
 - ↓ B/L in Nature
 - IgE Mediated immunologic Response.

- Hereditary causes
 - Autoimmune
 - Infection (Klebsiella ozae; Staphylococci; Streptococci)
 - Hormonal condⁿ
 - Miscellaneous

↓

Atrophy of Mucosa & N. fibre

↓

Leads to Crust formation

 - Foul Smelling crust is b/c of "atrophy of bone"
 - Symptom aggravates d/t loss of sensation
 - "Merici Bull anosmia"
 - ↳ Full of foul smelling crust, but pt. didn't get the smell
 - M/c Symptom = Nasal obstruction

⇒ Klebsiella infection is associated w/it. (S2)
↓
Ozaena

Doc ⇒

Streptomycin

Tetracycline

Used to dissolve
crust & clean
the Nose.

Sodium

bicarbonate 1

biborate 1

chloride 2

($\frac{B}{1} : \frac{B}{1} : \frac{C}{2}$)

It is
→ dissolve in
280 ml of H₂O
& used to irrigate
the nasal cavity

Complete obliteration of the Nose ⇒ Young's operation.

Partial closure of the Nose ⇒ Modified young's operation

↓

Leave 3mm opening ⇒ S.
Nt.

Injection of Teflon in the Lateral wall

↓

"Lautenslager Sx."

Following Removal of crust the Nose is painted w/ 25%
glucose in Glycerine.

↓

Glucose Inhibits
proteolytic organisms

↓

Glycerine is
hygroscopic Agent.

Kemicetine Antiozaena solution ⇒ contains chloramycetin, estradiol
& vit. D₂.

3. DRUG INDUCED RHINITIS

- d/t Vasodilators
 - Anti-hypertensives
 - Anticholinesterase
 - OCPs
- } ⇒ causes Rhinitis

- 4. Rhinitis Medicamentosa

↳ Withdrawal of Any Vasoconstrictor

⇓
Rebound Phenomenon

↳ Topical Steroids - Tx

5. VASOMOTOR RHINITIS (Nonallergic condition)

Less Sympathetic & Less Parasympathetic (Parasympathetic overactivity)

dissect the vidian Nerve (vidian. Neurectomy)

↳ Parasympathetic secretomotor fibres to Nose

GNB'S Symptom - Paroxysmal Sneezing on getting up early in Morning.

ARIA ⇒ Allergic Rhinitis & its Impact on Asthma.

6. Allergic Rhinitis - Type I HSN Rxn

O/E → Nasal Mucosa ⇒ Pale, boggy, Hypertrophic.

Allergic Salute ⇒ Transverse crease ⊕ on Nose d/t upward Rubbing of Nose

Granular Pharyngitis ⇒ d/t hyperplasia of Submucous Lymphoid tissue;

Tx → • Avoidance of allergen

• Medical Tx

• Specific Immunotherapy

} Allergic Shiner ⇒ Dark circles under the eyes.

• Turbinates all Swollen.

SINUSITIS **

(M > E > F > S)

(S3)

Least Commonly Involved

⇒ Investigation of choice = Rxoc = Endoscopy

⇒ Viral > Bacterial > Fungal
↓ ↓ ↓
Rhinovirus Streptococci A. fumigatus > Niger > Flavus

⇒ Radiological ⇒
Ixoc

CT Scan

M/C Site ⇒ Maxillary Sinus

↳ except ⇒ In fungal sinusitis

CT Scan findings in allergic Fungal Sinusitis ⇒

Area of high attenuation surrounded by a thin zone of low attenuation.

↓
Fungal ball formation, which is identical to soft tissue tumor

↓
Hence, "MRI of PNS"

also "Bony destruction"

- Allergic fungal sinusitis ⇒ Hallmark Not @mf
 - Non-allergic fungal sinusitis
 - Invasive fungal sinusitis
 - Non-invasive fungal sinusitis
- ↳ Fungal ball formation & Bony destruction

⇒ M/C site of Fungal ball ⇒ Maxillary sinus

Criteria \Rightarrow

2 Major + 1 Minor

Major

1 Major

OR
+

2 Minor
Minor

A \Rightarrow Anosmia

B \Rightarrow Blockage

C \Rightarrow Congestion

D \Rightarrow Discharge

E \Rightarrow Facial Pain

F \Rightarrow Fever (Acute sinusitis)

• Halitosis \Rightarrow > 3 Months

• Fever (chronic sinusitis)

• Pain in body
(Except facial)

Hallmark Symptom \Rightarrow Discharge

* if Cheek/dental / Swelling of Lower eyelid words \oplus in question



Maxillary

* if Root/Radix/Dorsum / Swelling of the Lower & upper eyelid words \oplus in question



Ethmoid

* if vertex / occipital / Retroorbital; words \oplus in question



Sphenoid

* Maxm headache - Morning } Frontal Sinusitis (54)
 Minm headache - Evening }

↳ Office headache

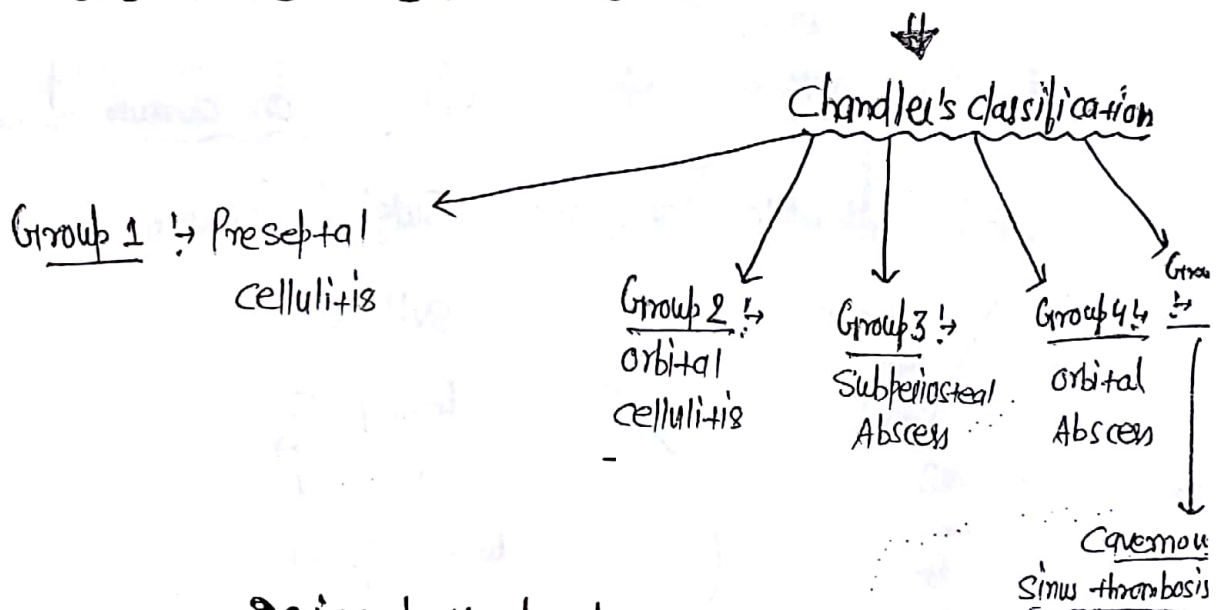
↓
 Shows: Periodicity

* Complication ↳
 Mucocoele
 Pyocoele
 Osteomyelitis
 Fistula

} all seen in frontal sinusitis

* Osteomyelitis of Frontal sinusitis ⇒ Pott Puffy Tumor

* Orbital cellulitis ; orbital Abscess ⇒ Ethmoidal sinusitis



Deviated Nasal Septum

- 2nd Mlc Pathology of Nose ↳ displacement of Nasal Septum,
 C/F of DNS :⇒ ① Epistaxis;
 ② Recurrent sinus infection;
- 40% DNS
- 4% has Symptomatic DNS
- 1% ⇒ Septoplasty.
- * Cottle test :⇒ Used to test Nasal obstruction d/t Abnormality of Nasal valve as in case of DNS.

• SMR = B/L Incision

SMR \Rightarrow Submucosal Resection

↳ Remove whole septum

• Septoplasty = U/L Incision

↳ Remove only deviated part.

* crooked Nose / Ugly Nose \Rightarrow Curving of septum as well as external Nose

↳ TxOC \Rightarrow Septo Rhinoplasty

↳ M/c cause \Rightarrow con Genital

\rightarrow external Nose deformity

* Saddle Nose \Rightarrow depression on dorsum of Nose

↳ M/c cause \Rightarrow Surgical Trauma



Syphilis;

Leprosy;

TB;

damage cartilaginous part

Wegner Granulomatosis \Rightarrow damage both

damage bony part.

RxOC \Rightarrow

Augmentation Rhinoplasty

↳ Glac crest is best graft.

- Hump Nose \Rightarrow Tilt \Rightarrow Reduction Rhinoplasty

(55)

M/c cause \Rightarrow Congenital.

external Nasal deformity.



- if ONLY septum Abn \Rightarrow Septoplasty
- external Nose Abn \Rightarrow Rhinoplasty
- if both are Abn \Rightarrow Septo Rhinoplasty

TRAUMA

• Superior trauma & Posterior trauma causes "Skull #"

• Anterior trauma, inferior trauma & Multidirectional trauma

\Downarrow causes

"Facial #"

• Longitudinal # seen in Parietal Trauma



It is More common; Result in

bleeding & CSF otorrhoea



Result in conductive deafness



Facial N. Palsy (20%)



Less symptoms

• Transverse # seen in occipital Trauma



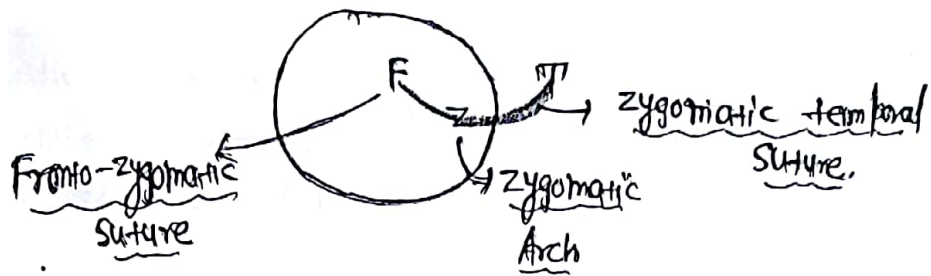
It is Less common \Rightarrow Result in SNHL

More symptoms
 \uparrow
(80%) Facial N. Palsy

Truncal trauma

* Mlc Facial bone # = Nasal bone #

2nd Mlc Facial bone # = zygomatic bone # / Infraorbital #

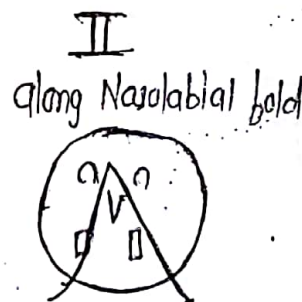
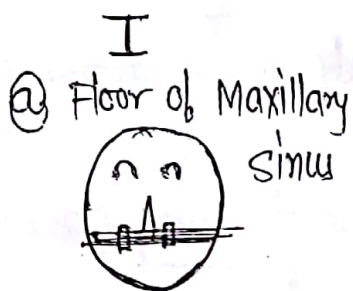


* Real drop sign = seen in orbital floor #

* Reduction should be done immediately ; if edema ⊕ ,
Give Anti-Inflammatory & Reduces E/in 5 days.

* Patient comes E/in 1st 21 days = close
after 21 days = open

Le fort classification ⇒ based on direction of # line



Low Maxillary #
OR
Guerin #

Hallmark feature ⇒ Floating palate

Pyramidal #

Cranio-facial dysjunction

CSF Rhinorrhea ⇒ III > II

gnd classification \Rightarrow Based on direction of Trauma
 Trauma coming from below

Class-I # \Rightarrow Below Results in Chevallet # (vertical #) (Perfect vertical)
 Class II # \Rightarrow Front Results in Tajjaway # (Horizontal #)
 Class III # \Rightarrow Multidirectional \hookrightarrow slightly oblique
 Trauma from Front

Malignancy

- * M/c Benign tumor of Nose \Rightarrow Capillary hemangioma
- * M/c site for capillary hemangioma \Rightarrow Litter's Area
- * M/c site for cavernous hemangioma \Rightarrow Inferior turbinate
- * M/c site for Malignant Melanoma \Rightarrow Nasal septum
- * M/c site for Papilloma \Rightarrow vestibule / skin behind columella

Inverted Papilloma (Ringelz tumor / Schneiderian Papilloma)

- Pre-Malignant cond^m \hookrightarrow d/t HPV
- always U/L
- M/F (40-70yr)
- M/c site \Rightarrow "Lateral wall of Nose" from Non-olfactory epithelium of Nose.
- 40-60yr is Age of distribution

- Ixoc \Rightarrow "Biopsy" is Must for diagnosis.

Roc \Rightarrow Medial Maxillectomy via Latelal Rhinotomy or Midfacial degloving Approach. ("RT" is Not Advised)

* M/c Malignancy of Nose \Rightarrow Squamous cell ca

\Downarrow
M/c site \Rightarrow Lateral wall of Nose

All tumor of Nose \Rightarrow Mx \Rightarrow Surgery.

PNS (Para-Nasal sinus)

M/c benign tumor \Rightarrow Osteoma

\Downarrow
Seen in frontal sinus > Ethmoidal > Maxillary

Mx = Surgery ***

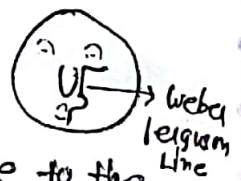
* M/c Malignancy = Sq. cell carcinoma \Rightarrow in Maxillary sinus **
 \hookrightarrow in Nickel industry

* 2nd M/c Malignancy = Adenoca; seen in ethmoidal
 \hookrightarrow in Wood industry workers

Mx \Rightarrow Sx + RT *

For Maxillary sinus \Rightarrow Weber bergson incision **

Ohngrev's Line \Rightarrow extends from medial canthus of eye to the Angle of Mandible

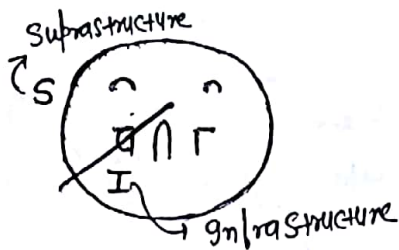


Maxillary Ca

(57)

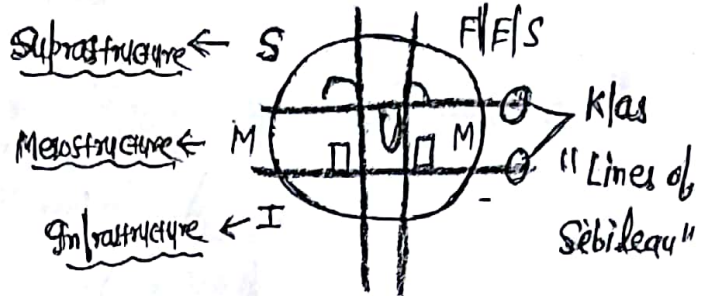
Ohngren's classification

- Use 1 Line



Ledermann classification

- Use 4 Lines



Tumor below Line \Rightarrow Good Prognosis
Above Line \Rightarrow Bad Prognosis

Epistaxis \rightarrow Bleeding from Nose

Site	Location of site	Type of bleeding	Most Common
Little's Area	Ant. part of septum	Arterial	In child
Kisselbach's Area			caused by Nose pick

Retro-columellar vein

Ant. part of septum

Venous

Young Adult

X

Wood Ruff plexus

Post. part of Septum

Venous

Old

HTN

of Lateral wall

\rightarrow Bleeding is from Source Anterior to the Piniform aperture & blood flows out from front of Nose.
Anterior epistaxis is More Common & less severe;

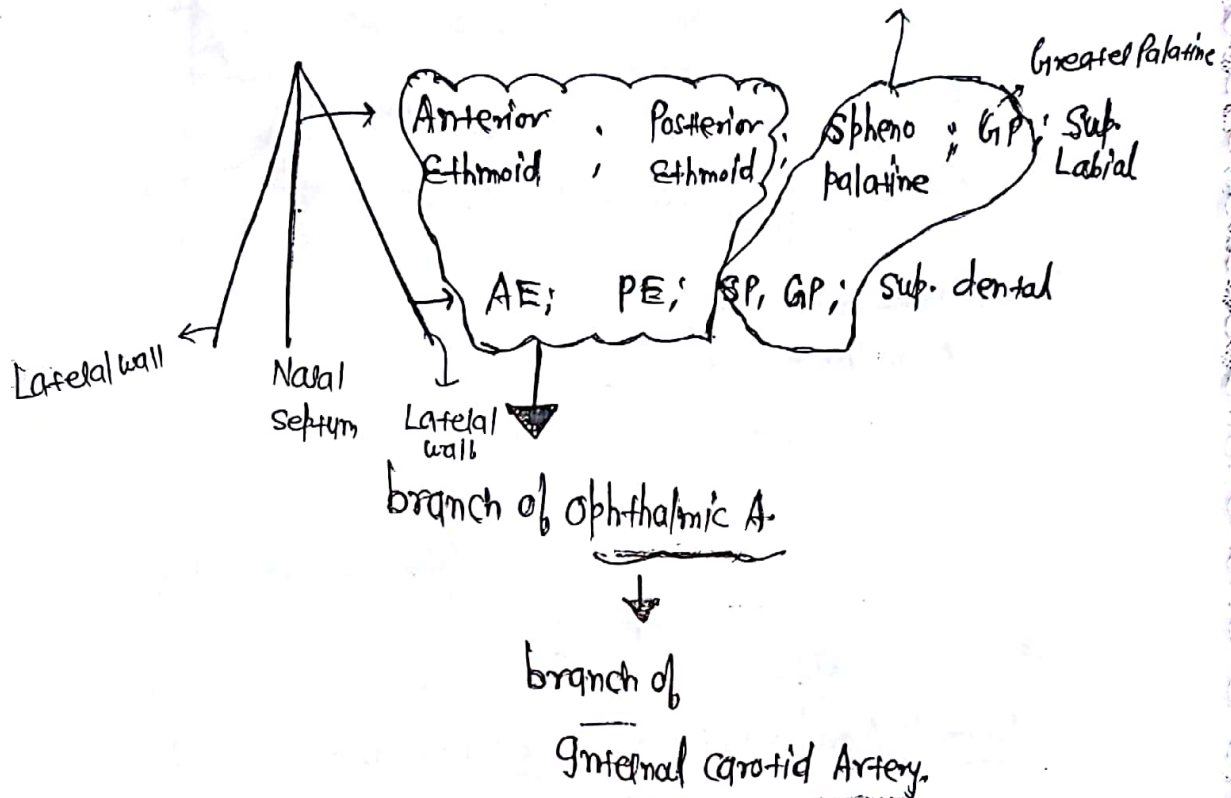
Posterior epistaxis is less common & more severe;

\rightarrow Bleeding is from vessel situated Posterior to Piniform aperture & blood usually flows back into the throat. Bleeding is usually spontaneous & with retraction of the nostrils.

* Venous plexus
of Post. Part
of Septum

= Brown's Area
↓
4th Area of epistaxis
↑
branch of external Carotid A.
↑
branch of Maxillary A.

*



⇒ Artery of epistaxis ⇒ Sphenopalatine A

⇒ Pinch out Nose | Spit the blood ⇒ Trotter Method

↓
Control 90% of bleeding.

if Not control

Anterior & Posterior Packing

↓
Chemical cautery (1% AgNO₃)

← Endoscopic Ligation of Sphenopalatine A

⇒ if bleeding above middle turbinate

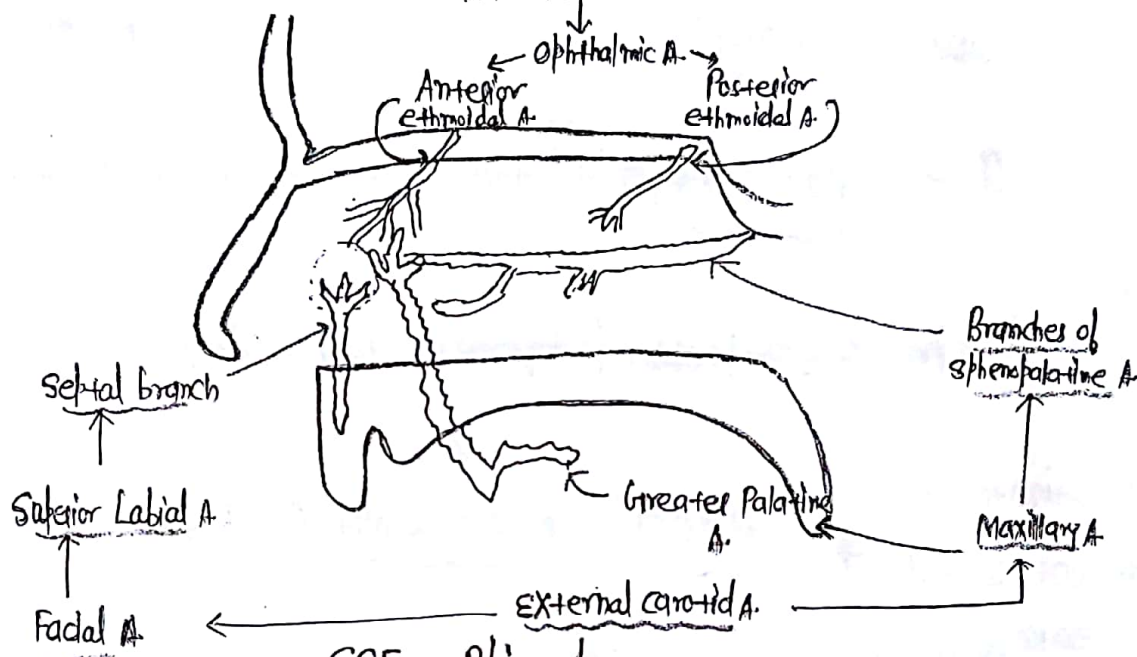
(SB)

↳ Ligate Anterior Ethmoid A.

⇒ In old age / tumor / chemotherapy / excessive bleed

↳ Ligate External carotid A.

⇒ TESPAL (Trans Nasal Endoscopic Sphenopalatine A. Ligation) ⇒
INTERNAL CAROTID A. done for epistaxis



CSF Rhinorrhoea

- Disruption of the barriers b/w the sinusal cavity & the Anterior & Middle cranial fossa

↓
discharge of CSF in Nasal cavity

↓
CSF Rhinorrhoea

Fovea Ethmoidalis

↳ Mucly Involved in CSF Rhinorrhoea

Cribiform plate ⇒ Maxim No. of Leaks

Surgical trauma

Head Trauma (gof.)

Praxmatic



Double Ring sign

Non-traumatic

(Spontaneous)

↑ ICP

○ Single Ring sign

- Tea-pot sign ⊕ in CSF-Rhinorrhoea

CSF Rhinorrhoea

- Traumatic
- Non-sticky discharge
- Sniffing Not possible
- Glucose $> 30 \text{ mg/dl}$

Sinusitis

- Infective
- Sticky discharge.
- Sniffing possible
- $< 10 \text{ mg/dl}$.

Confirmatory diagnosis \Rightarrow β_2 -transferrin ^{***} (Highly sensitive as well as specific)
 \Downarrow
in Electrophoresis (confirmatory investigation)

Investigation to detect site of Leakage \Rightarrow "HRCT" \bar{c} or \bar{c}/out Gadolinium

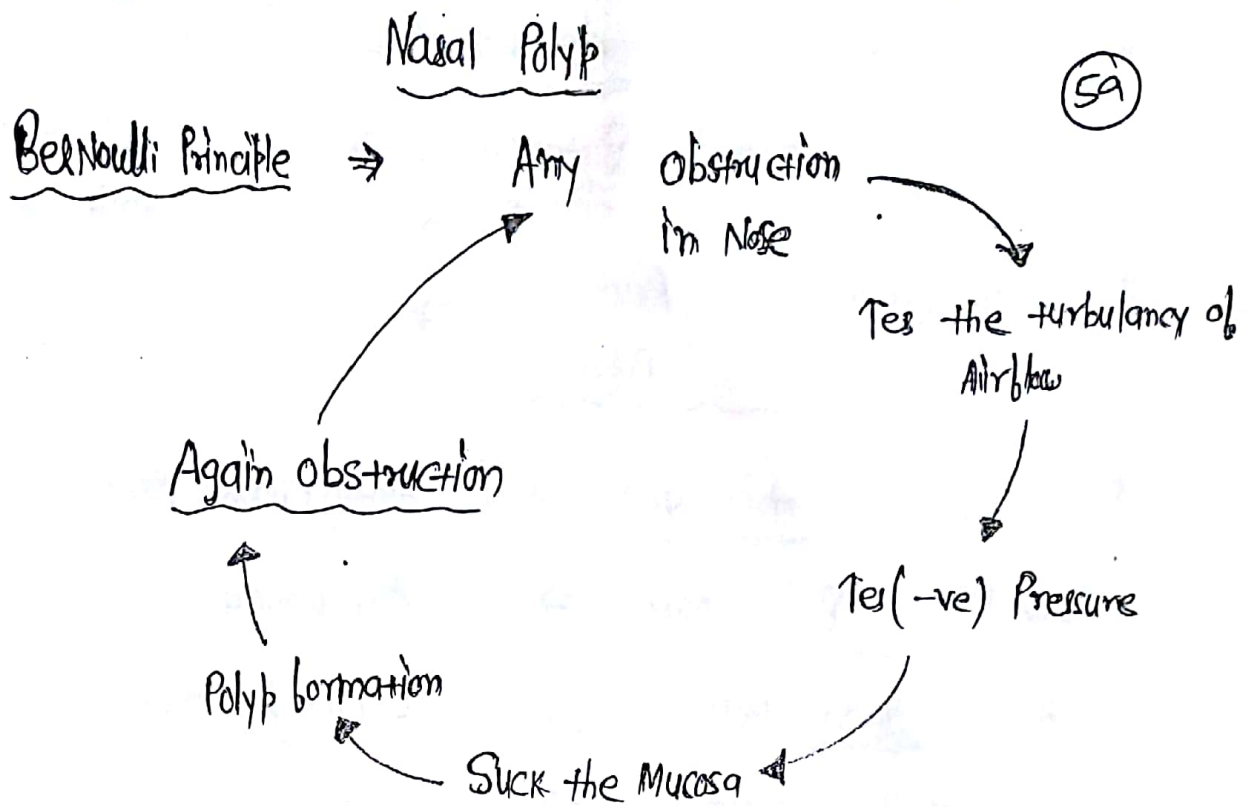
Rxoc \Rightarrow Wait & watch \bar{c}
w/ Antibiotics

\downarrow if No improvement
 \bar{c}/in 2 weeks.

Go for endoscopic Repair

Queckenstedt test \Rightarrow Compression of Jugular vein leads to res CSF Leak; dlt res in ICP.

Tissue test (Handkerchief test) \Rightarrow Unlike Nasal Mucosa, CSF doesn't cause a tissue to stiffen.



• Nasal Polyp + Bronchiectasis + Dextrocardia



KARTAGENER SYNDROME **

• Nasal Polyp + Bronchiectasis + AZOSpermia



YOUNG SYNDROME **

Nasal Polyp + B. Asthma + Aspirin sensitivity



SAMTER'S Triad **

* Age < 2yr Mass in Nose

↳ Intra cranial Mass
↳ Grv. ⇒ CT-Brain*

* Nasal discharge + Age < 2yr

↳ Foreign body

* Age (2-10yr) + Recurrent Polyp ⇒ Cystic fibrosis

* Age (10-14yr) + Polyp ⇒ Antrochoanal Polyp

* Age (14yr) Boy + Mass ⇒ Angiofibroma

* Age 20-40yr + Mass ⇒ Ethmoidal Polyp

* Age 40-60yr + Mass ⇒ Inverted Papilloma

* Age > 60yr + Mass ⇒ Squamous cell Ca

ANTROCHOANAL POLYP / Killian's Polyp^{***}
↳ Choana ↳ 10-14yr

ETHMOIDAL POLYP
↳ 20-40yr.

Maxillary
Sinus

Trilobes

U/L

Single

- Age ⇒ 10-14yr.

- Infection is the Main cause

*** Hyponasal voice ⊕

Grape like

B/L

Multiple

20-40yr

Allergy is the Main cause

↓
Anti-allergic

Steroids

Ixoc = Rxoc = Endoscopy

* Frog face deformity / Angiofibroma

↳ Main vessels involved in the bleeding is Internal Maxillary A.

* High grade lesion \bar{c} H/o Trauma \bar{c} B/L Paliboidal Mass



Septal Abscess

↳ I&D done in 48 hours.

↳ to prevent Septal perforation ***

* Rhinophyma \Rightarrow Hypertrophy of Sebaceous gland

↳ k/as " Potato Nose / Rum Nose / Whisky Nose "

↳ Seen in alcoholics **

Rx \Rightarrow Surgery. **

* Rhinoscleroma \Rightarrow Bacterial Infection



Klebsiella Rhinoscleromatis



Doc \Rightarrow - Streptomycin

Tetracycline

↳ Ulceration + Crust formation + Woody Nose

* Mikulicz Cells \Rightarrow Large cell

Russell's body \Rightarrow Small cell.

Microphage

Eosinophils

* Rhinosporidiosis (Rhino. Seebert) ! \Rightarrow Fungal disease

Seen in Tamil Nadu

Protozoal disease

Rx \Rightarrow Dapsone

Sx (T_{XOC})*

L cautery is Mandatory (heavy bleeding)

\Rightarrow Mulberry like Nasal Polyp / Vocal cords

Mulberry like Nasal Mucosa \Rightarrow Hyper-trophic Rhinitis

* Sarcoidosis \Rightarrow Strawberry appearance of Nose

* Rhinosporidiosis \Rightarrow Strawberry appearance of Nasal Mass

FESS (Functional Endoscopic Sinus surgery)

Endoscopy is from Lateral wall of Nose, which is equivalent to Medial wall of Sinus; Without Any Scar hence is k/as "FESS"

\rightarrow Open approach is done through Anterior wall of sinus; hence Scar (incision) \oplus nt!

\Rightarrow Most dangerous complication of Endoscopy

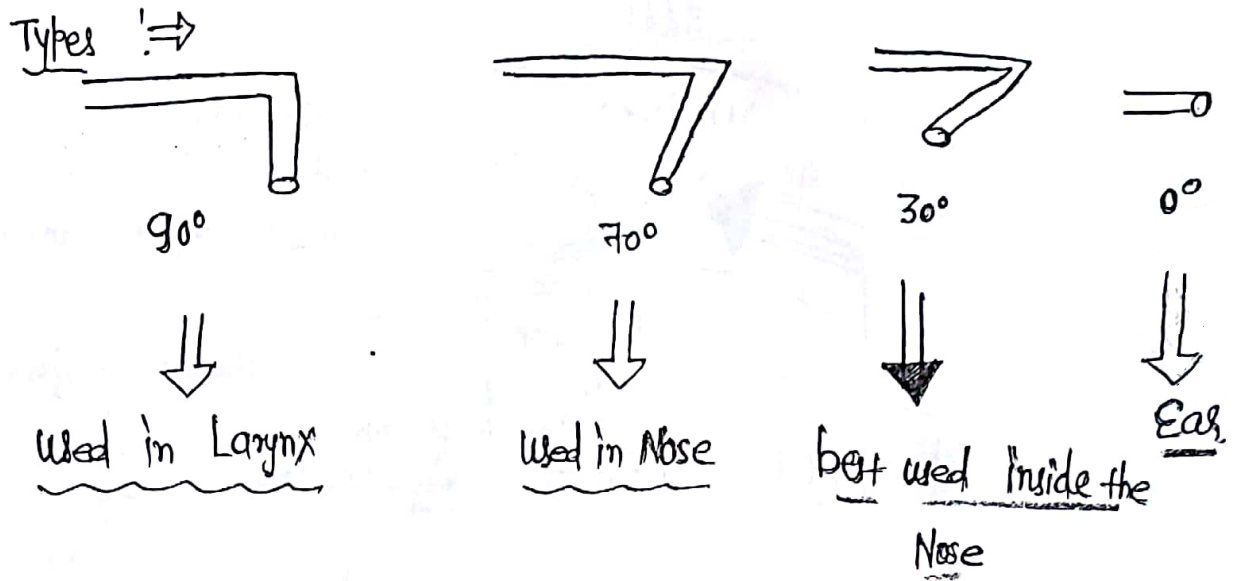
L CSF-Rhinorrhoea

L 1.3%

Rare complication of Endoscopy \Rightarrow Retrorbital hematoma

\downarrow
d/t Ant. ethmoidal Artery an

Endoscopy \Rightarrow 2.7mm diameter \Rightarrow Pediatric population (61)
 \Rightarrow 4mm diameter \Rightarrow Adult population



Stamberger approach \Rightarrow 1st Anterior then Posterior Approach

Wigand approach \Rightarrow 1st Posterior then Anterior Approach.

1st Pass \Rightarrow Inferior Meatus | Palate

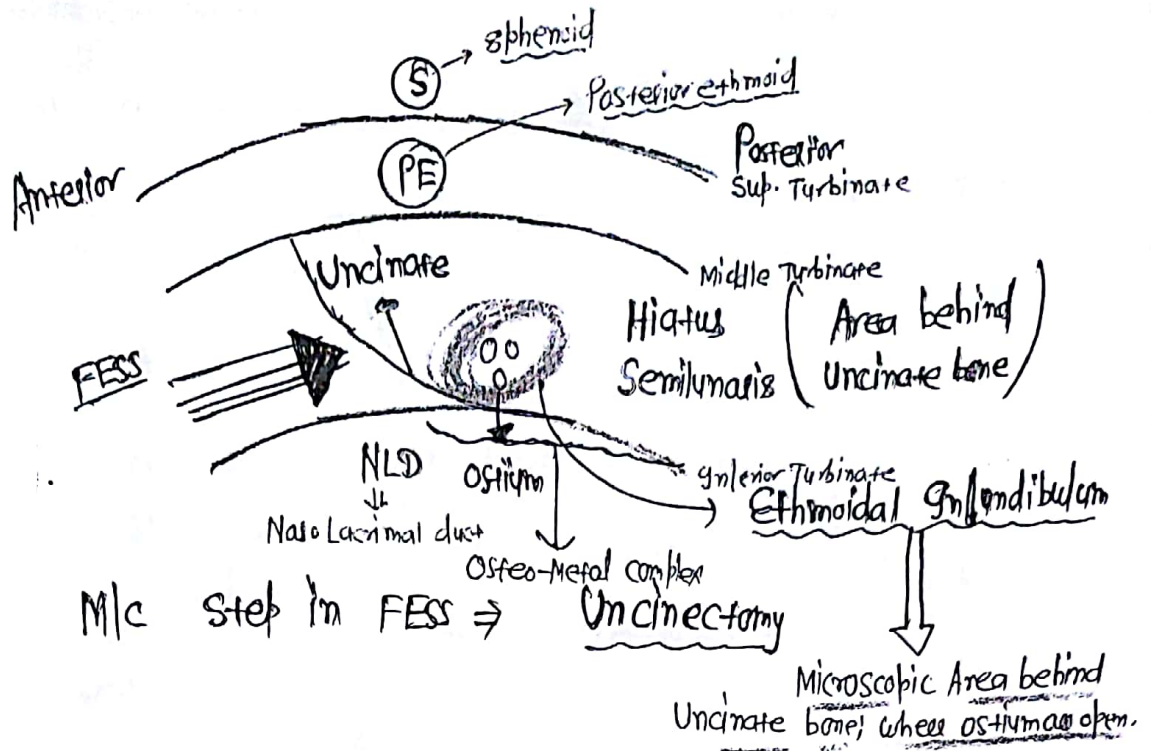
2nd Pass \Rightarrow Superior | Superior | Anterior part of Middle Meatus

3rd Pass \Rightarrow Posterior part of Middle Meatus.

Q. Pain Sensation from Ethmoidal Sinus all carried out by ??

a) Frontal N. b) Lacrimal N. c) ~~Nasociliary br. of~~ Trigeminal N. d) Infra-orbital N.

Q. M/c sinus affected in children \rightarrow Ethmoid (well developed @ birth).

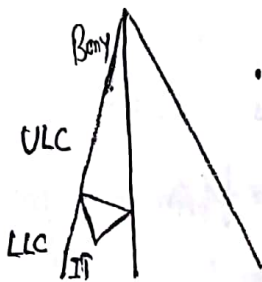


During Inspiration Air-flow is \Rightarrow Linear flow

During Expiration Air-flow is \Rightarrow Turbulent flow

\Downarrow

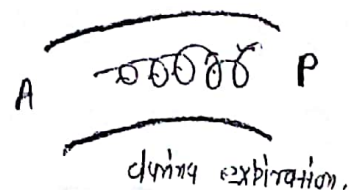
d/dt Limen Nasi
(Internal Nasal Valve)**



- Internal Nasal Valve \rightarrow aka "Limen Nasi"
- 3 Boundaries \Rightarrow ULC (Upper Lateral cartilage); Inf. turbinate; Septum.
- It is narrowest space of nostril;
- \Downarrow
- therefore res turbulence

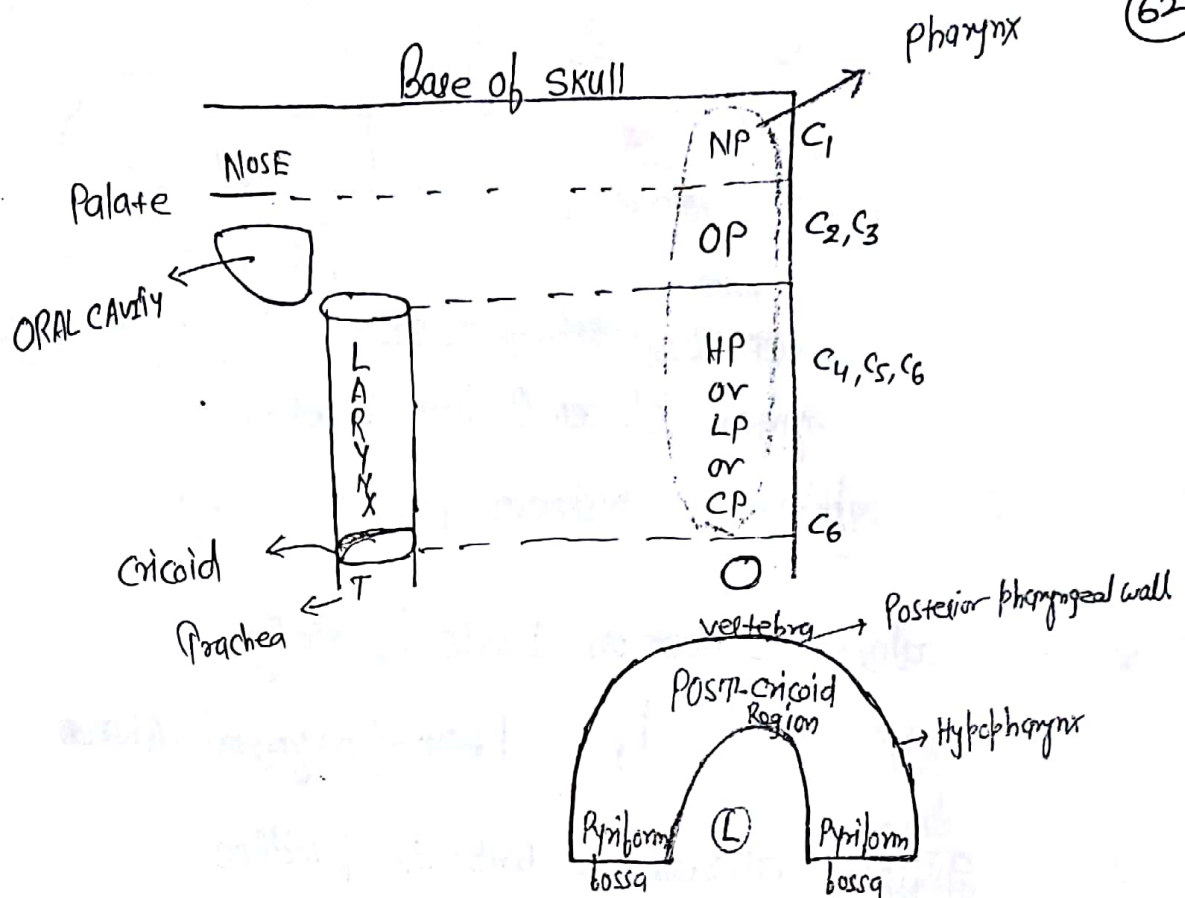
\Downarrow

this turbulent flow is more during expiration;
therefore sinus ventilation is more during expiration.



PHARYNX \Rightarrow 12-14 cm Long; extending from base of skull to lower border of cricoid cartilage

(62)



* Hypopharynx is divided into — Pyriform bossa & Post. cricoid space

* Pyriform bossa \Rightarrow M/c site for hypo-pharynx malignancy.
— Internal br. of SLN passes here.

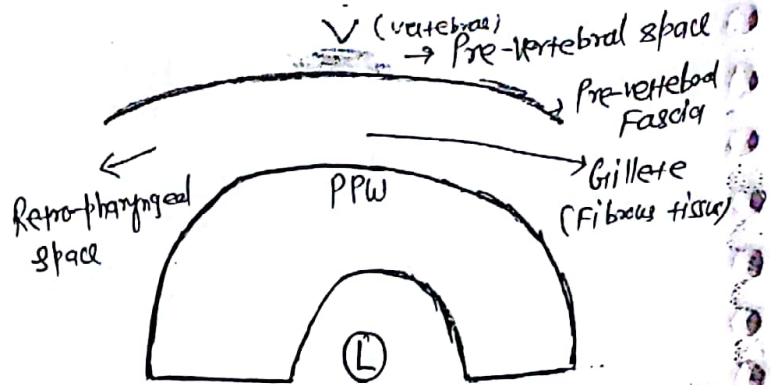
— Block in Pyriform bossa for supra-glottic examination.

* Post-cricoid Malignancy \Rightarrow have very poor prognosis

\Rightarrow More common in ♀ suffering from Plummer-Vinson syndrome.

• Retro-pharyngeal space

↙ ↘
Rt. space of Gillette Lt. space of Gillette



- * DANGER SPACE / ALAR SPACE : ⇒ Lies b/w Alar fascia Anteriorly & Prevertebral fascia Posteriorly. extends from skull base to diaphragm.
- * Retro-pharyngeal Abscess & pre-vertebral abscess both presents
 = dysphagia; dyspnea.

- * Localized abscess on 1 side of Midline
 ↳ Retro-pharyngeal Abscess.

- * Diffuse abscess on both side of Midline
 ↳ Pre-vertebral Abscess

- * Retropharyngeal Abscess extends up to "Bifurcation of Trachea":

- * M/cc of Pre-vertebral Abscess ⇒ TB Spine

- * M/cc of Chronic Retropharyngeal Abscess ⇒ TB Lungs

- * M/cc of Acute Retro-pharyngeal Abscess ⇒ Tonsil (Adenoid)
 In Pediatric age

- * M/cc of Acute Retro-pharyngeal Abscess in Adult ⇒ Gastrogenic Trauma

- * Mxoc ⇒ Incision & drainage

- * If TB is suspected ⇒ Go for ATT firstly.

Technique ⇒

Intra-oral ⇒ For Acute cases

Extra-oral, along Post. Surface of SCM ⇒ For chronic cases

M/c Abscess of Head & Neck \Leftarrow Para-pharyngeal Abscess \Rightarrow Trismus \Rightarrow Marked features \Rightarrow Reduced opening of jaws.
 b/c of spasm in Medial Pterygoid Muscle

- Abscess on Lateral side of pharynx from base of (63)

Skull to hyoid bone

- Tonsils pushed Medially; Swelling in upper part of Sternocleidomastoid
 - Mx \Rightarrow I & D @ the level of hyoid Along

always external
 Neck incision; Intracapsular
 is Not sufficient.

Ant. Surface of SCM
PARAPHARYNGEAL SPACE

Prestyloid compartment

↓ contain

Pterygoid Muscles

Post-styloid compartment

↓ Contains
 6 structure of Neck

Carotid A.
Jugular v.
9, 10, 11, 12 CN.

Swelling over & behind the Angle of Mandible \bar{c} torticollis is seen in

\hookrightarrow Para-pharyngeal Abscess

M/c \Rightarrow Removal of Tonsil OR
 Tonsillitis (60-1)
 d/t tooth extraction (40-1).

woody swelling
 below chin.

Ludwig Abscess

- "Klas" Sub Mandibular Abscess

- M/c \Rightarrow Dental carries (Premolar & Molar)

- Mixed flora (Aerobic & Anaerobic both)

- diabetic pt \hookrightarrow M/c Aerobes \Rightarrow α -hemolytic streptococci.

- Mx = I & D

Structure of Pharyngeal wall
1st Layer \Rightarrow Mucosa \Rightarrow Non-Keratinising stratified sq epithelium

\Downarrow
Except \Rightarrow In Nasopharynx
 \hookrightarrow ciliated columnal epithelium (NEET 16)

2nd Layer \Rightarrow Inner fascia \Rightarrow Pharyngobasilar fascia

3rd Layer \Rightarrow Inner Muscle complex \Rightarrow Stylopharyngeus
Salpingopharyngeus
Palatopharyngeus \downarrow Post. to Anterior

4th Layer \Rightarrow Outer Muscle complex \Rightarrow Constrictor - Superior
Middle
Inferior

5th Layer \Rightarrow outer fascia \Rightarrow Buccopharyngeal fascia

TONSIL \Rightarrow covered by Non keratinizing stratified squamous epithelium

— Any Lymphoid tissue in pharynx

Types \Rightarrow

• Palatine — @ Palate

• Lingual — @ Lingual tonsil

• Tubal (Gierlach) — @ Eustachian tube

• Adenoid (Pharyngeal) — @ base of skull & c₁ Junction

• Faucial \leftarrow extension of Palatine tonsil

In fossa of Rosenmüller
Nasopharyngeal tonsils. ^{QA}

Lined by Pseudo-stratified ciliated columnar epithelium.
Boundary of Faucial tonsil \Rightarrow Lateral wall of oropharynx.

* Unlike Palatine tonsils;
Adenoids have No crypts &
No capsule

* Mucosa = Middle boundary

\hookrightarrow crypt formation

\hookrightarrow 15 in No. \rightarrow Largest crypt \Rightarrow CRYPTA MAGNA

* Inner fascia = Lateral boundary

* Tonsillar bed = Inner Muscle / outer Muscle / outer fascia

\hookrightarrow Content = Styloid & 9th CN

* Palatoglossus \rightarrow Ant. pillar of tonsillar bed

* Palatopharyngeus \rightarrow Post. pillar of tonsillar bed.

* Main Artery supply to the tonsil \Rightarrow Tonsillar branch of Facial Artery

^{QA} * Tonsil usually Reach a Maxm size @ Puberty ($\approx 12yr$).

* Graveyard of ENT surgeon \Rightarrow Tonsillolingual Sulcus (easily Missed during oral examination).

^{QA} * Lymphatics from the tonsil pierce the superior constrictor & drains into upper deep cervical Nodes (Level II); particularly the Jugulo-digastric (tonsillar) Node

TONSILLITIS

- klas " Pharyngitis "

- caused by " Adenovirus "

" Streptococcus " (β -hemolytic streptococcus)

DOC \Rightarrow Amoxiclav

\downarrow

Pt is Not Responding \Rightarrow Tonsillectomy (TxOC)

\downarrow

(Rose Position) \Rightarrow Neck extended

* Indication of Tonsillectomy \Rightarrow

ABSOLUTE INDICATION \Rightarrow

Malignancy

Lymphoma (in Pediatric Age gr)

\rightarrow Muco-epidermoid carcinoma
(Adult)

- Recurrent tonsillitis

RELATIVE INDICATION \Rightarrow Non-Responding suppurative infection

- Non-Responding Rheumatic fever

Absolute Recurrent Tonsillitis

\downarrow

Means seven or more episodes $\leftarrow 7 \times 1 \text{ yr} = 7$
in 1 yr.

five episodes / year for

2 yr

$\leftarrow 5 \times 2 \text{ yr} = 10$

3 episodes / year for

3 yr

$\leftarrow 3 \times 3 \text{ yr} = 9$

New definition of Recurrent tonsillitis $\Rightarrow \geq 4$ episodes of tonsillitis + (65)

Quinsy \Rightarrow collection of Pus in the peritonsillar space, which lies b/w the capsule of tonsil & the superior constrictor muscle.

Single episodes of cervical LN

Enlargement or single episode of

"Quinsy"

Usually; U/L

present $\hat{=}$ odynophagia

Pt. can't swallow his own saliva; which dribbles from Angle of Mouth.

Peritonsillar Abscess.

"Hot Potato Voice"

Rx \Rightarrow g&d of abscess $\hat{=}$ Antibiotics.
so; Pt. is usually dehydrated.

* Miscellaneous Indication of Tonsillectomy \Rightarrow

Long styloid process \rightarrow K/Las "Eagle Syndrome"

- (AbN) 9th Nerve

Alc to Balaguchi $\begin{matrix} > 3\text{cm} \\ > 4\text{cm} \end{matrix}$

Glossopharyngeal Neuralgia

* ClI of tonsillectomy



• Age $< 3\text{yrs}$

• Hb $< 10\text{gm (w/w)}$

• Bleeding D/o

• Acute episodes

• Epidemic of Polio

(b/c Polio spread by Nerve)

& we exposed Nerve in Tonsillectomy;
 \downarrow
9th Nerve

Sx after 3 weeks

go for Laser tonsillectomy

Complication of Tonsillectomy \Rightarrow

Most Common \Rightarrow Hemorrhage;

1^o Hemorrhage

- Bleed on table
(vein > Artery)
- d/t damage to the
peri-tonsillar vein

(Kla "descending palatine vein" /
"dennis brown vein")

Reactionary Hemorrhage (< 24 hr)

- d/t slippage
of Ligature

Tonsillar branch of Facial Artery.

2^o Hemorrhage (> 24 hr)

- d/t Infections

Mx \Rightarrow Ligate

Mx \Rightarrow Religate

Mx = i/v Antibiotics

Rare complication

\Rightarrow

More common in down syndrome children.
GRIESEL SYNDROME

↑ evening pain \rightarrow give Analgesics

- Atlanto-Axial joint dislocation

- Gt Require Neuro Surgery opinion.

Excessive Hemorrhage from tonsillectomy is d/t injury of \Rightarrow

a) External Palatine vein ; b) Ascending Palatine A.

c) Tonsillar br. of Facial A. ; d) Internal carotid A.

SINUS OF MORGAGNI

- space b/w the base of skull & upper free border of superior constrictor Muscle.
- Through it enters :
 - The Eustachian tube;
 - The Levator veli Palatini;
 - Tensor veli Palatini;
 - Ascending Palatine A.
 - \hookrightarrow Branch of Facial A.

ANGIOFIBROMA

- Benign tumor; but Locally destructive
- Age → 14 yr boy
(7-19 yr Range)
- Ixoc ⇒ CT-Scan
- Frog face deformity
- Hollman - Miller sign
- Originate from sphenopalatine foramen
- Dumbbell-shaped tumor
- Symptom → Epistaxis (M/c);
- Nasal obstruction

• Rxoc ⇒ Surgery (Recurrence is Common)

- Biopsy is CI

Before Sx

- CT
- Hormone Rx
- RT
- embolization

vinorelbine
Flutamide
To Reduce
Size of
tumor

↳ of Internal Maxillary A. to
stop epistaxis

* RT is used; if it extends intracranially.

NASOPHARYNGEAL CA

- Malignant (66)
- Kias "GUANGDONG TUMOR"
- Bimodal Distribution
1st Peak → 20 yr
2nd → 60 yr

• Ixoc ⇒ MRI

Origin ⇒ Behind Eustachian tube

M/c site ⇒ Fossa of Rosenmuller

- Middle ear symptoms always ⊕

- U/cervical LAP (M/c symptom)

- Epistaxis (2nd M/c)

- A/w EBV

- TROTTER'S TRIAD is seen
+ Mandibular Neuralgia
Glue ear + 5th CN + 6th CN.
↓ ↓
Pain Palatal
Palsy

⇒ M/c Involved N. ⇒ 5th CN
First to Involved N. ⇒ 6th CN

Rxoc ⇒ RT (Radiotherapy)

" RT + chemotherapy "

↳ Never Surgery.

* Small size tumor ⇒ Trans palatal approach;

* Large size tumor ⇒ Trans palatal + sublabial
Approach

↓
SARGANA APPROACH

* Congenital Abnormality of Pinna \Rightarrow

① Bat Ear \Rightarrow Absent Antihelix;

② Mozart Ear \Rightarrow Mixing of Helix & Antihelix

Result in Sigmoid fossa
absent,

③ Wilder Muth Ear \Rightarrow Absent Helix

Incomplete fusion of
hillocks leads to
pre-auricular sinus

Hillock of
H1s

} 4
} 5
} 6



Symptom \Rightarrow Discharge

Pit \Rightarrow Sx.

* Head Mirror \Rightarrow Concave Mirror;

\hookrightarrow Focal Length = 45 cm

Diameter = 89 mm

Diameter of Hde = 19 mm.

* Focal Length of Microscope used in ENT Surgery \Rightarrow

Ear \rightarrow 200 mm

Nose \rightarrow 300 mm

Throat (Larynx/Pharynx) \rightarrow 400 mm

ADENOIDS

(67)

- Known as "Nasopharyngeal tonsils".
- Present @ birth ; Shows Physiological enlargement up to age of 6 years & then tends to Atrophy @ Puberty & almost completely disappear by 20 years of Age
- Rhinolalia clausa \Rightarrow In Adenoid hypertrophy
 - \hookrightarrow Toneless voice
 - Loses Nasal quality d/t Nasal obstruction.
- It has No crypts & No capsule unlike Palatine tonsil.
- Adenoid Hypertrophy \Rightarrow Nasal obstruction \Rightarrow commonest symptom;
 - Fails to thrive
 - \hookrightarrow b/c Nasal obstruction interferes w feeding or Suckling in a child.
 - Adenoid facies \rightarrow elongated face w dull expression ; open mouth ; Pinched up Nose ; Prominent & crowded upper teeth.
 - Apnoea \rightarrow Lack of conⁿ ;

Tx \hookrightarrow

Decongestants ;

Antihistamines ;

Adenoidectomy.

Other Indication

Chronic

Recurrent URTI

Recurrent Middle ear Infections w deafness CSOM.

Cleft Palate

Acute inflammation of URT

* Thornwaldt cyst \Rightarrow Located in the midline of posterior wall of the Nasopharynx in the Adenoid Mass.

When
Infected \rightarrow

Abscess can form

\Downarrow
Thornwaldt's disease
 \Downarrow

Sx \Rightarrow Marsupialization of Swelling;
Complete Removal of Lining of cyst.